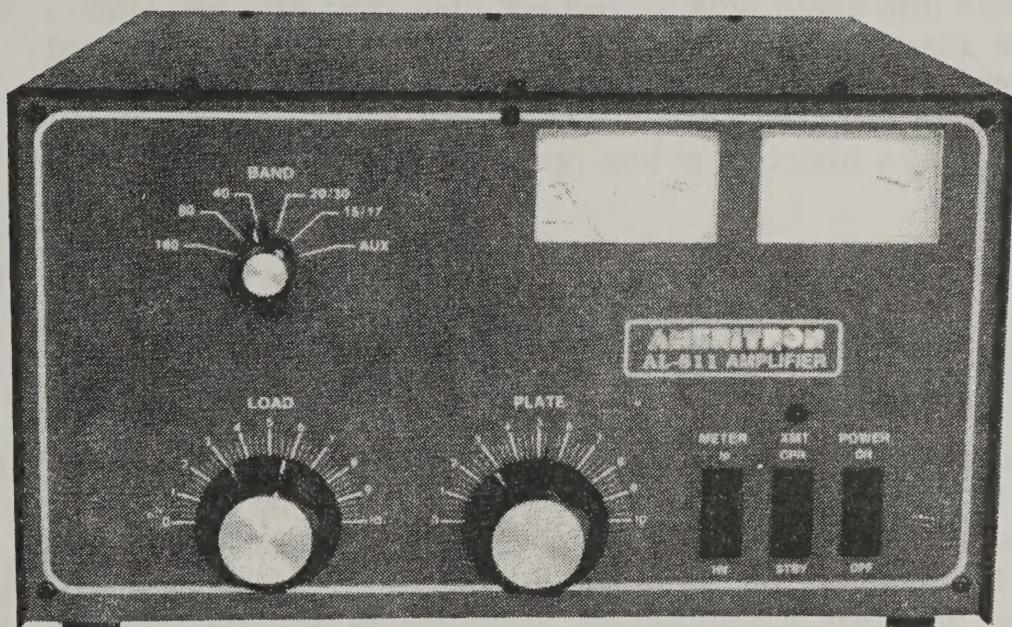


AMERITRON AL-811

HF POWER LINEAR AMPLIFIER INSTRUCTION MANUAL



The Ameritron AL-811 is an economical 600 watt output linear amplifier that operates reliably from 160 through 15 meters. The AL-811 uses three 811A tubes in a class AB2 grounded grid circuit. Heavy duty power supply and RF components provide a long service life for components. The AL-811 is shipped factory wired for 120 volt, 50/60 Hz power mains. The AL-811X export model is shipped factory wired for 240 volt, 50/60 Hz power mains.

AMERITRON
116 Willow Road
Starkville, MS 39759

PLEASE READ THIS MANUAL BEFORE ATTEMPTING TO OPERATE EQUIPMENT

UNPACKING INSTRUCTIONS

1. Carefully lift the amplifier by the bottom cabinet edge out of the shipping carton. Place the amplifier on a firm, level surface and carefully inspect it for shipping damage. Contact the shipper immediately if any damage exists. This carton has been designed for maximum protection of the amplifier during transit. Save the carton and packing material for shipping in the future.
2. Remove all screws holding the cover on with a number 2 phillips screwdriver. Carefully lift the cover off the amplifier. Save the screws to resecure the cover.
3. Locate the fuse pack with the two 12 amp fuses and fuse caps. If additional screws are needed, they will be in the fuse pack also. **NOTE: Fuses supplied are for 120/110/100V operation. If you are rewiring the AL-811 for 240/230/220V operation, you must use 6 amp fuses.** The AL-811X export model is pre-wired for 240 V operation and is supplied with 6 amp fuses.
4. Remove the foam packing material (left side, front view) that secures the 811A tubes during transit. Carefully unwrap the tubes. Do not dislodge or break the fiber shaft that is connected to the rear input bandswitch wafer.
5. To install the tubes in the sockets be sure the large diameter pins line up with the two large diameter holes in each socket. Do NOT rock or twist the tubes excessively during the installation. If the tubes are already installed, check the tubes for proper seating. If necessary, press the tubes down into their sockets with gentle force. Do not rock or twist the tube(s) excessively. Also check that the anode caps are secure and did not come loose during the unwrapping process.
6. The white ceramic anode connectors will have to be removed from the top metal cap of each tube if it ever becomes necessary to remove the tubes from the amplifier. This can be a difficult procedure because of the high clamping force of the internal springs in the anode connector may hold it to the tube cap very tightly. The tube will break if direct upward or rocking pressure is applied in an attempt to remove the connector. The safest way to remove the ceramic connector is to lift the tube out of its socket. A twisting or spinning pulling motion can then be applied while holding the ceramic connector firmly until the tube and connector are separated. Repeat the procedure for the other tubes.
7. Install the cover with the vent holes to the left (near the tubes) by installing the back screws first. Install all the screws loosely and tighten them only after all the screws are in place.
8. Install the fuses and fuse caps on the back of the unit. Read the manual to become familiar with the operation of the AL-811 amplifier.

AL-811 LINEAR AMPLIFIER

FEATURES

The AL-811 is a grounded grid linear amplifier developed by Ameritron using low cost 811A power triodes. It operates in class AB2 for SSB and CW.

- 1. Fast Warm Up Time:** The 811A tubes take approximately 3 seconds to warm-up.
- 2. Long Tube Life:** The 811A tubes are long life, reliable transmitting tubes. 811A tubes offer operation even on RTTY and SSTV.
- 3. Tuned Input:** A Pi-Network tuned input matches the 811A tubes to 50 ohm excitors.
- 4. Two Illuminated Panel Meters:** The AL-811 has two illuminated panel meters. The Grid Current meter provides a continuous reading of the 811A grid current to indicate proper loading of the amplifier. The other meter switches between High Voltage (HV) and Plate Current (Ip).
- 5. Safety Interlock:** AC is removed from the transformer when the cover is removed. **Never attempt to defeat this switch.**
- 6. Operate/Standby Switch:** Used to remove the Amplifier from the RF line while filament and plate voltages are maintained for "barefoot" operation.
- 7. XMT Indicator LED:** Provides a front panel indication of proper amplifier keying by the exciter during operation.
- 8. ALC Voltage:** The drive level is detected to provide a negative control voltage for the exciter. **ALC** prevents overdriving of the linear and reduces distortion from excessive drive power.

CAUTION: This amplifier must be disconnected from the power mains before removing the cover. See the precaution on Page 7.

TECHNICAL SPECIFICATIONS AL-811*

Frequency Coverage

Domestic model(AL-811): 160, 80, 40, 30, 20, 17 and 15 meters

Export model(AL-811X): 160, 80, 40, 30, 20, 17, 15, 12 and 10 meters

Input

Circuit type: Pi-network, slug tuned coils

Maximum VSWR at resonance: 1.3:1

Minimum 2:1 VSWR bandwidth: 15%

Maximum drive power permissible: 85 watts

Typical drive for rated output: 55 watts

Output

Circuit type: Pi-network

1/2 hour carrier: 400 watts

30 second carrier: 550 watts

1/2 hour PEP two tone: 600 watts or better

30 seconds PEP two tone: 600 watts or better

Efficiency: typically 70% or better

ALC

Negative going, 0-20V, adjustable, phono jack

Power Supply

Circuit type: full wave bridge

No load voltage: 1700 V

Full load voltage: 1500 V

Full load current: 550 mA

Regulation: 12%

Maximum draw at rated output: 8 A(120V)

AC Input: 120V, 50/60 Hz (AL-811)

240V, 50/60 Hz (AL-811X)

Metering

Multimeter: reads HV and plate current

Grid meter: reads PA grid current

Connectors

Relay: keys amplifier when grounded. Sources +12 VDC open circuit and supplies 100 mA when grounded. A built-in back-pulse cancelling diode protects the exciter.

RF input: SO-239 50 ohm input

RF out: 50 ohms with full power into any SWR below 3:1

Power: NEMA 5-15P 120V grounded style

Physical

Dimensions: 16" D x 13 $\frac{3}{4}$ " W x 8" H

Weight: 30 lbs.

*specifications are subject to change without notice or obligation.

GENERAL INFORMATION

SAFETY INTERLOCK

The interlock switch closes to allow AC line voltage to reach the power transformer as long as the AL811's top cover is in place. When the top cover is removed, the interlock opens and disconnects the line voltage. This does not discharge the bank of power supply filter capacitors. Be sure to allow the filter capacitors to discharge before you touch anything inside the Amplifier. You can select the High Voltage function of the Multimeter to check the high voltage potential. **WARNING: Never remove the cover of this amplifier with the unit plugged into the power line.**

DRIVING POWER

This Amplifier is designed to operate at full ratings when it is driven by an exciter that has approximately 70 watts of RF output. You can use an exciter that has lower output power, but the Amplifier's output may be less. If you use an exciter that delivers more than 70 watts, carefully adjust the driving power to avoid "over drive" and the creation of spurious signals, which create needless interference to other operators. We highly recommend that you use a monitor scope for continuous output monitoring. The display on an oscilloscope is the best readily available way of determining the amplitude of the voice peaks which, if excessive, can cause "flat topping" and splatter.

IMPORTANT: In no case should you advance the power output control of your exciter beyond the point where the amplifier's power output indication ceases to increase. Nonlinear operation may occur if you turn the control past this point.

FILAMENT SUPPLY

The filament circuit of this amplifier satisfies all requirements of the tube manufacturer related to tube performance and life. Inrush current is controlled by the transformer internal resistance and impedance, filament choke resistance and filament wiring resistance. To insure maximum life of the tube never replace any circuit components or wiring with substitute parts.

ALC CIRCUIT

The ALC circuit converts a portion of the RF drive voltage at the exciter end of the tuned input circuit to a negative going control voltage. This voltage should be used to limit the exciter drive to safe drive levels for the AL-811 for exciters that develop more than 70 watts of output power.

A capacitive divider consisting of C27 and C28 is used to reduce the RF voltage and drive a rectifier circuit consisting of D17 and D18. The resulting voltage is filtered by C29 and R12 and applied to the ALC potentiometer R14. R13 provides RF and DC isolation for the ALC jack. The DC isolation prevents loading of the exciter ALC input line by the ALC potentiometer.

The ALC circuit can be adjusted by loading the AL-811 slightly beyond the recommended maximum values with the ALC line disconnected. The ALC line can then be connected and the ALC control on the amplifier adjusted to a point just before the drive begins to decrease.

NOTE: The primary use of the ALC function is the prevention of excessive drive levels. This circuit will not prevent small changes in output power from occurring on different bands. Destructive levels of drive power are those above 100 watts under most conditions. Slight changes may occur in maximum output power on different frequencies with the ALC connected. A compromise in ALC adjustment may be necessary to achieve acceptable performance on all bands.

PLATE SUPPLY

The power supply in this amplifier uses a combination plate, filament and control transformer. A buck boost winding is provided to allow the user to compensate for low, medium or high power line voltages. This amplifier is normally supplied wired for the highest power line voltage setting. Never change this setting unless you are positive that performance is suffering due to low filament and plate voltages. The life of components will be shortened drastically if the high voltage exceeds 1800 volts at rest. The diagram on page 4 shows proper wiring for each voltage.

EXPORT MODIFICATIONS

A simple modification will allow operation on frequencies above 15 meters. Instructions for this modification are available by sending a written request for "Export Modification Instructions" along with a copy of a valid amateur license. There is no charge for this information. Export models are shipped with this modification and have an "X" following the serial number. Standard frequency coverages are indicated in the chart on page 7.

TECHNICAL ASSISTANCE

Technical assistance is available during our normal business hours on weekdays. The following information is required to assist you with operational problems:

1. Model and Serial Number
2. Date of purchase and dealer
3. An accurate description of the problem

Meter readings at all stages of the tuning procedure are very important along with a complete description of the other equipment used with our product.

Written assistance is also available. Due to time delays in processing mail, please allow at least three weeks for a written reply.

AMERITRON
116 Willow Road
Starkville, MS 39759
Telephone-(601) 323-8211

662-323-8211

METERING FUNCTIONS

The AL-811 has two illuminated panel meters. The right meter reads PA grid current up to 200mA. The normal current with a single tone (carrier) signal will be around 150 mA. If the current is too high during full power operation, the loading control should be advanced to a higher setting. If the current is too low, the loading control should

be turned to a lower setting.

The left meter reads PA high voltage of 2000 volts and plate current of 750 mA. The normal readings are 1500-1700 volts HV and 550 mA of current at full rated output with a single tone signal.

INSTALLATION

LOCATION

Do not operate the Amplifier in excessively warm locations or near heating vents or radiators. Be sure air can circulate freely around and through the Amplifier cabinet. Provide an unobstructed air inlet for the blower. Do NOT place any books, magazines or equipment that will impede the free flow of air near the sides of the cabinet.

VENTILATION

The AL-811 ventilation system has been designed and tested to maintain the 811A tube temperature safely below the tube manufacturer's rating at 500 watts output with a 100% duty cycle. To insure proper ventilation in your installation, observe the following:

1. Do not block or restrict the ventilation holes in the cover.
2. The exhaust air flow is over 20CFM. Do not "assist" the air flow unless the fan exceeds the AL-811 fan CFM by a factor of 2:1.
3. Do not mount additional fans on the AL-811 cabinet.
4. The exhaust air will become warm at high power levels. Do not place any heat sensitive objects in the exhaust air stream.

GROUNDING

Connect a good earth or water pipe ground to the ground post on the rear panel of the Amplifier. Use the heaviest and shortest connection possible.

Before you use a water pipe ground, inspect the connections around the water meter and make sure that no plastic or rubber hose connections are used. These connections interrupt electrical continuity to the water supply line. Install a jumper around any insulating water connections you may find. Use heavy copper wire and pipe clamps. It is best to ground all equipment to one point at the operating position and then ground this point as described above.

POWER CONNECTIONS

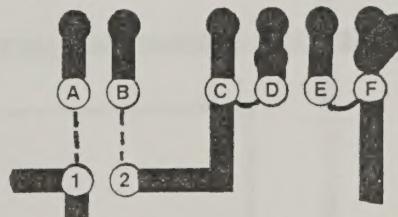
The AL-811 is supplied with a NEMA 5-15P plug for 120V operation. The power required to operate the AL-811 is not high enough to warrant 240V operation unless 120V

is not available. The fuses should be 12 ampere fuses for 120V and must be changed to 6 amperes for 240V operation. The diagram below shows the proper wiring for 120V operation. Operation on a voltage of 240V is not required, nor will it necessarily improve performance. The power transformer will perform equally well with a power line frequency of 60 Hz or 50 Hz. The Transformer Connections chart at the bottom of this page shows proper connections for various line voltages.

The AL-811X (export model) is wired for 240V, 50/60 Hz operation. The appropriate plug is not provided for this model. You must wire the proper plug on the end of the power cord supplied. Simply cut the existing plug off and wire the appropriate plug in its place. If the line voltage in your country is not 240V, then you must change the transformer to the appropriate setting indicated by the chart below. Note: the AL-811 transformer allows operation on 100V line voltage in countries such as Japan.

NEVER REWIRE THE POWER SUPPLY TO BOOST THE HIGH VOLTAGE ABOVE 1800 VOLTS.

The wiring between the fuse box and the amplifier AC outlet must be 14 gauge or larger in order to supply the operating current required (8 amperes) without a significant drop in the line voltage. The outlet should be fused for the wire gauge used.



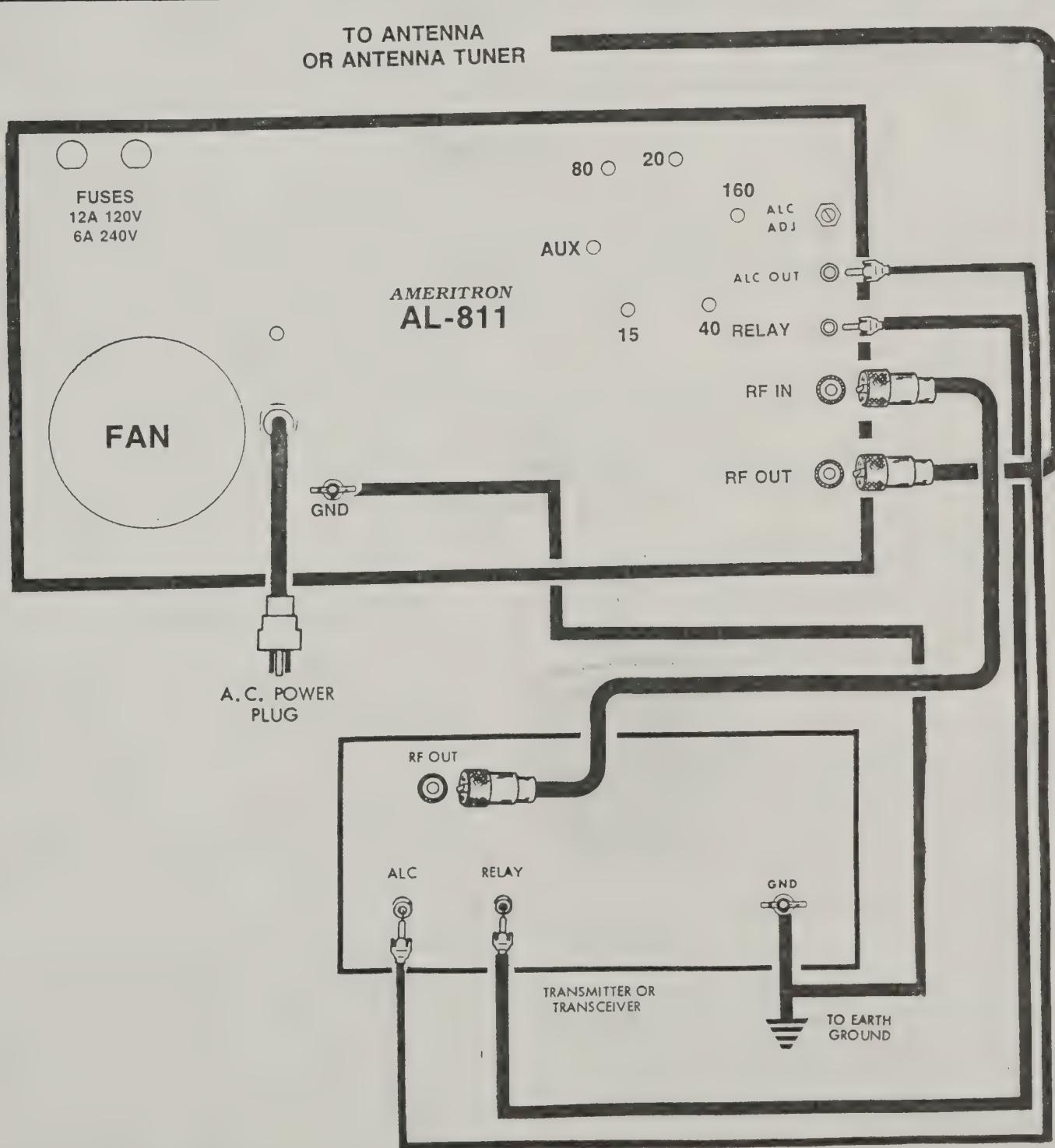
* Factory wired operation for the AL-811

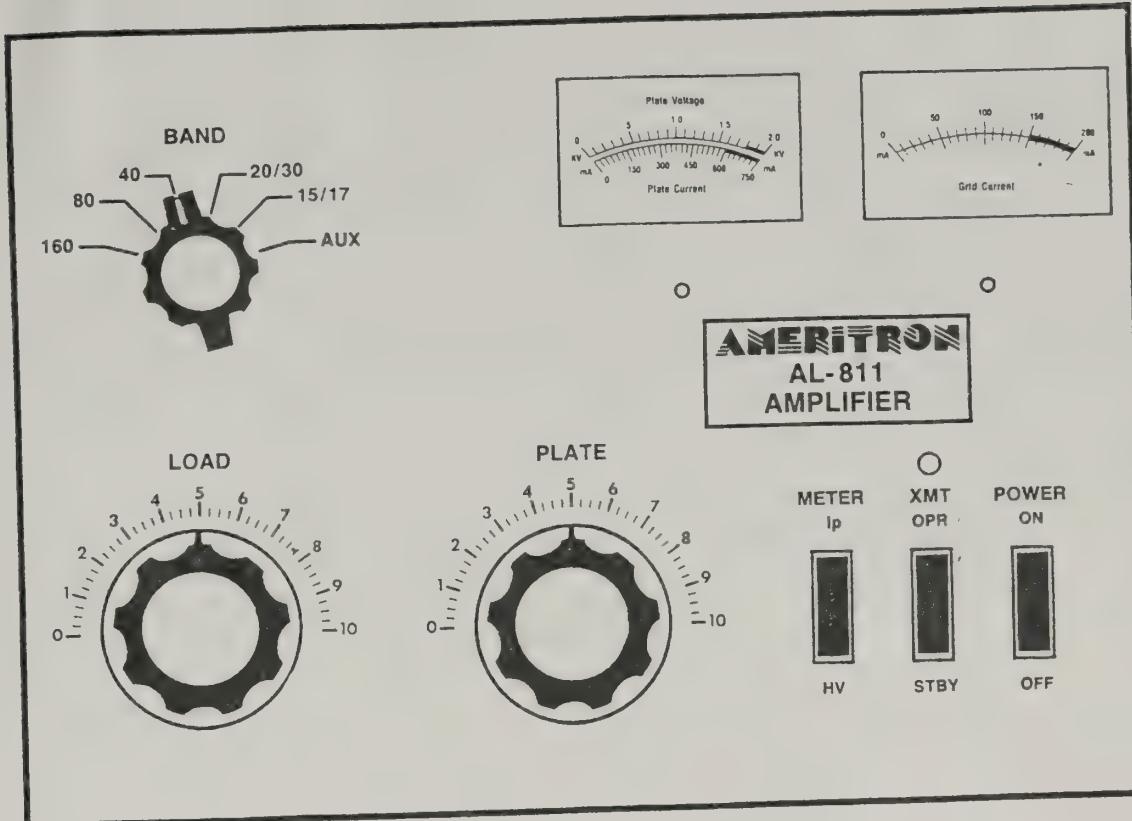
** Factory wired operation for the AL-811X

| VOLTAGE | BUCK BOOST | PRIMARY |
|---------|--------------------|-----------------|
| *120 | A to 1, B to 2 | C to D, E to F |
| 110 | 1 to 2, (A,B open) | C to D, E to F |
| 100 | A to 2, B to 1 | C to D, E to F |
| **240 | A to 1, B to 2 | C no connection |
| 230 | 1 to 2 (A,B open) | D to E |
| 220 | A to 2, B to 1 | F no connection |

INTERCONNECTIONS

1. Connect the RF output of the transmitter to the RF IN connector on the rear of the AL-811 with 50 ohm coax. Use any 50 ohm cable (RG-58 is fine) with PL-259 plugs.
2. Connect the existing station antenna system to the RF OUT connector on the AL-811 with any 50 ohm coaxial cable capable of carrying 500 watts.
3. Use shielded audio type cable with standard male phono plugs to connect the RELAY jack on the AL-811 to the exciter's normally open amplifier keying circuit. The keying circuit in the AL-811 has positive 12 VDC open circuit and provides 100 mA of current when pulled to ground. The AL-811 has an internal back-pulse cancelling diode across the relay coil.
4. Connect the shortest ground lead possible from a good earth ground to the GND terminal. The best leads are solid (instead of stranded or braided) copper. It is also best to use a common ground point for all the equipment in the station.
5. Use a shielded audio cable with a standard male phono plug to connect the ALC jack to the negative going ALC input jack on the exciter. *Do not connect this line until you have read and understand the function of the ALC circuit.* Exciters with output powers below 70 watts do not normally require this connection. If this jack is connected without adjusting the ALC control, the exciter may not develop any drive power.





TUNE-UP

CW PROCEDURE

Follow the instructions in numerical order. If the various meter readings are different than the instructions, check the connections from the exciter to the amplifier and make sure they are correct. Consult the manual for the exciter if necessary. Be sure the transformer is correctly wired for your line voltage. See the "Power Connection" instructions on page 4 for wiring details.

1. Set the AL-811 front panel switches as follows:
OFF-ON to OFF
OPR-STBY to STBY
Ip-HV to HV
2. Plug the line cord into the proper voltage outlet.
3. Set the power switch to the **ON** position. The meter lamps should light and the fan should start. Read the 2000 volt scale on the multimeter. It should indicate 1700 volts nominal and no more than 1800 volts.
4. With the amplifier still on **STBY**, tune the exciter into the normal 50 ohm load according to the manufacturer's instructions. Turn the exciter drive fully down after tuning.
5. Place the amplifier bandswitch on the same band as the exciter, the **PLATE** control in the dial range for the band selected, and the **LOAD** control as indicated:

| MHz | Load | Plate | MHz | Load | Plate |
|------|------|-------|------|------|-------|
| 1.80 | 3 | 1 | 10.0 | 0 | 7 |
| 1.90 | 4 | 2 | 14.0 | 4½ | 8½ |
| 3.5 | 3 | 4½ | 18.1 | 4 | 8½ |
| 3.7 | 4 | 5 | 21.0 | 5 | 9 |
| 4.0 | 4½ | 5½ | 28.5 | 5 | 9½ |
| 7.0 | 4½ | 7½ | | | |
| 7.3 | 4½ | 7½ | | | |

6. With the exciter drive still at zero, place the **HV-Ip** switch in the **Ip** position. Observe the 750 mA scale. It should read zero. Place the **STBY-OPR** switch in the **OPR** position.
7. Key the exciter (no drive). The Transmit (**XMT**) LED should light. Observe the plate current on the 750 mA scale. It should be 110 mA.

NOTE: The no drive current will vary up to 25% due to component and line voltage tolerances.

8. Apply only enough drive to indicate a grid current of 100 mA or an **Ip** of no more than 450 mA. Tune the **PLATE** control for maximum output power. It is normal for the plate current to dip at this point. *If the grid current goes over 150 mA, reduce the drive at once.* Unkey the exciter.
9. Observe the output on an external RF wattmeter. Increase the drive until full exciter power (never to exceed 100watts) or 150mA of grid current is achieved. Quickly adjust the **PLATE** and **LOAD** controls for maximum output power.
10. Reduce the drive until the desired output level is obtained.

NOTE: Rotating the **LOAD** control clockwise reduces grid current for a given amount of drive. If the **LOAD** control is set at too low a numerical setting, a severe stress on tank components may occur. The **PLATE** control should always be peaked for maximum grid current or output power. Do not exceed 700mA of plate current during tuneup.

OPERATION OF OTHER MODES

SSB:

Tune up the Exciter and Amplifier as described in "TUNE UP" section and switch the exciter to SSB. Normal ranges of meter readings on SSB are between 20 and 50 percent of the CW carrier readings. This is due to the different peak to average power ratios in the operators speech waveform. The only true way to measure peak output power is with a good peak reading wattmeter or monitor scope. A whistle should produce the same values obtained on CW. Any effort to run more than these values will produce splatter and distortion.

SSTV, FM, RTTY, PACKET, AMTOR:

The plate current should be limited to 400 mA maximum. The grid current should be limited to 120 mA and the amplifier tuned for peak output power with the drive reduced to hold the grid and plate currents below the ratings given.

NOTE:

Some excitors put out short duration high power RF pulses when first keyed. Exciter power output peaks may reach or exceed full output level settings even if the exciter's power control is adjusted to deliver a fraction of full power under "keydown" conditions.

The amplifier loading control must be set high enough (clockwise) to prevent extremely high energy levels from developing in the plate and grid circuits of the amplifier. **DO NOT "UNDERLOAD" THE AMPLIFIER TO REDUCE POWER.** Never "retune" the amplifier to produce higher efficiency with reduced drive except under the SSTV, FM, RTTY, PACKET, and AMTOR section. Poor linearity, splatter or even damage to components may result from failure to follow instructions.

The AL-811 will operate with full output on all WARC bands except 24.5 MHz. The AL-811X (export model) will operate with full output on all WARC bands.

STANDARD FREQUENCY COVERAGE

AL-811

| | |
|--------------|-----------------|
| 160 meters | 1.8 - 2.0 MHz |
| 80 meters | 3.3 - 4.4 MHz |
| 40 meters | 6.3 - 8.3 MHz |
| 30/20 meters | 9.5 - 15.5 MHz |
| 17/15 meters | 15.5 - 21.5 MHz |

AL-811X

| | |
|--------------|-----------------|
| 160 meters | 1.8 - 2.0 MHz |
| 80 meters | 3.3 - 4.4 MHz |
| 40 meters | 6.3 - 8.3 MHz |
| 30/20 meters | 9.5 - 15.5 MHz |
| 17/15 meters | 15.5 - 21.5 MHz |
| 12/10 meters | 24 - 29 MHz |

WARNING!!

DO NOT ATTEMPT TO PUT THIS AMPLIFIER IN SERVICE WITH THE COVER REMOVED! CONTACT WITH VOLTAGES INSIDE THIS AMPLIFIER CAN BE FATAL! ALWAYS DISCONNECT THE AMPLIFIER FROM THE POWER MAINS AND WAIT FOR THE FILTER CAPACITORS TO DISCHARGE BEFORE REMOVING THE COVER.

PERIODIC MAINTENANCE

The high voltage present on the plate choke and air variable capacitors attract dust and dirt out of the air stream. It is particularly important that the high voltage areas at the bottom of the plate choke and the insulators on the air variable capacitors be dust free. These areas should be inspected every few months if the amplifier is operated in a dusty environment. Unplug the line cord, and wait at least 90 seconds until the power supply

capacitors discharge. Remove the cover and connect a jumper wire from ground to the anode connection of the tubes. **NOTE: This is a safety wire that must be installed when beginning service work and removed when work is finished.**

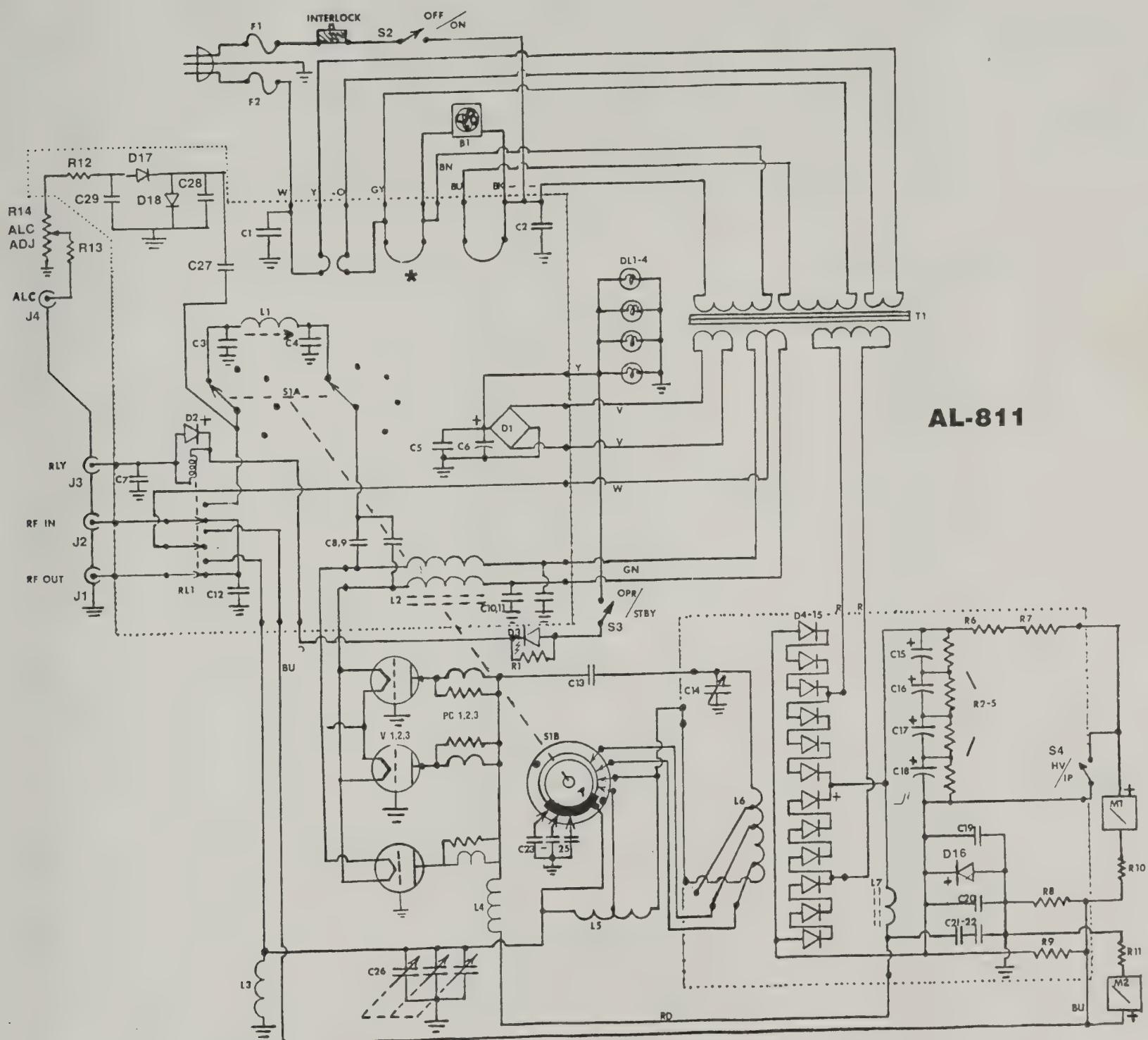
Use a soft bristle brush dipped in alcohol to clean areas mentioned previously.

NOTES:

| BAND | LOAD | PLATE |
|--------|------|-------|
| 160 | | |
| 80 CW | | |
| 75 SSB | | |
| 40 CW | | |
| 40 SSB | | |
| 30 CW | | |
| 30 SSB | | |
| 20 CW | | |
| 20 SSB | | |
| 17 | | |
| 15 CW | | |
| 15 SSB | | |
| | | |

Fill in this chart with your actual settings and you can quickly change bands. We suggest you use a pencil as settings may change as you alter your antennas.

AL-811 SCHEMATIC
Power supply shown wired for 120V operation *



| AL-811 INPUT CHART | | | |
|--------------------|----------------|------------------|-----------------|
| BAND | C3 (PF) | L1 | C4 (PF) |
| 160 | | 28.75T(405-1287) | 1300 (208-5177) |
| 80 | | 23.75T(405-1237) | 500 (208-5691) |
| 40 | 750 (208-5668) | 13.75T(405-1137) | 500 (208-5691) |
| 20 | 330 (208-5331) | 9.75T(405-1097) | 180 (208-5605) |
| 15 | 270 (208-5775) | 6.75T(405-1067) | 150 (208-5396) |
| 10 | 180 (208-5605) | 4.75T(405-1047) | 100 (208-5174) |

PARTS LIST

Designation:

B1

C1, 2, 21, 22

C3, 4

C5, 7, 19

C6

C8, 9, 10, 11, 29

C12, 27

C13

C14

C15, 16, 17, 18

C20

C23, 25

C24

C26

C28

D1

D2, 16

D3

D4 - 15

D17, 18

J1, 2

J3, 4

L1

L2

L3

L4

L5

L6

M1

M2

R1

R2, 3, 4, 5

R6, 7

R8

R9

R10

R11

R12

R13

R14

RL1

S1A

S2B

S2, 3, 4

S5

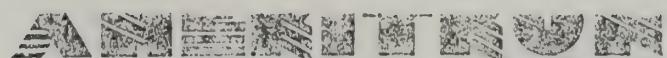
T1

V1, 2, 3

Description:

Ameritron Part #:

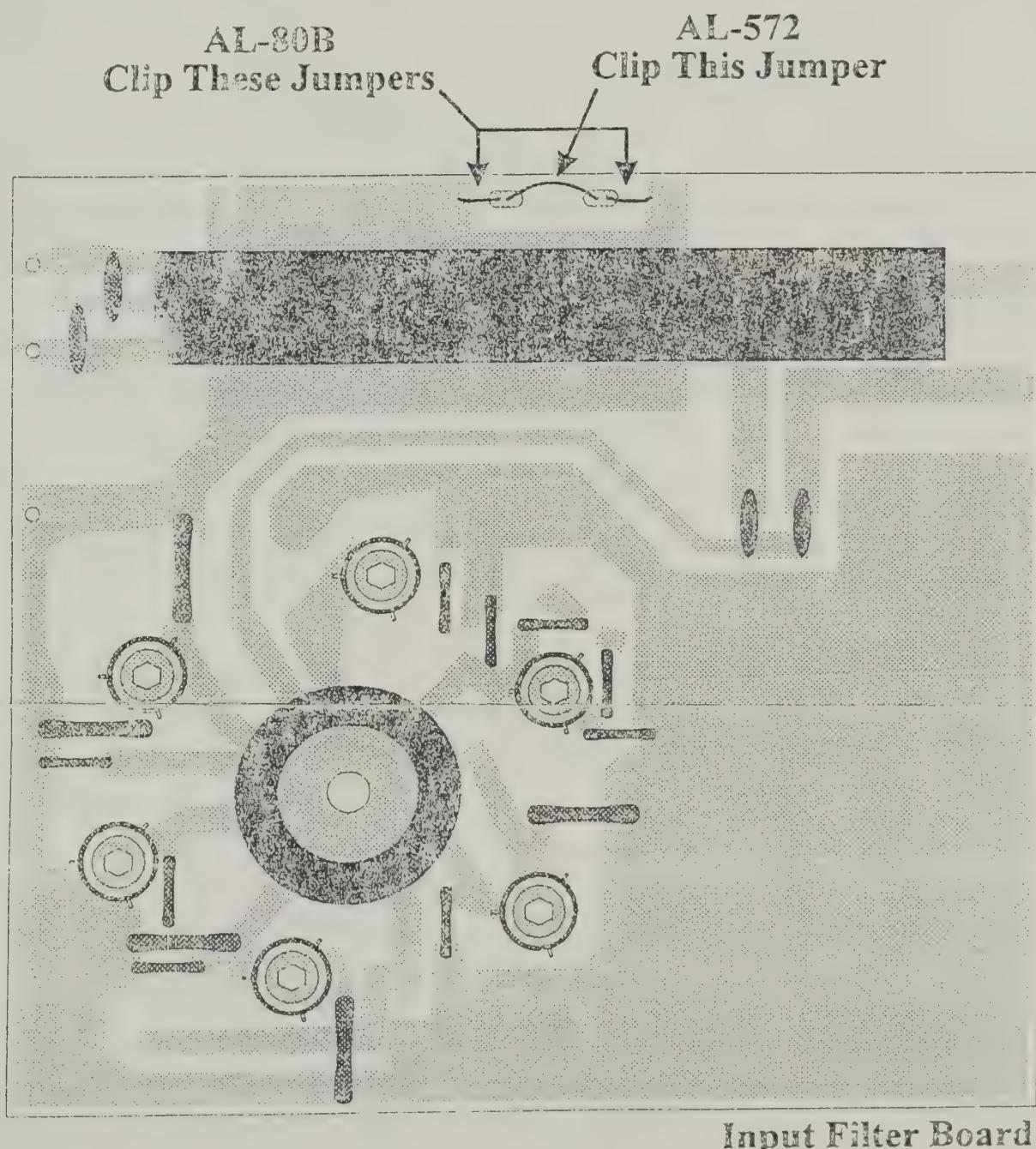
| | |
|-------------------------|------------|
| Fan | 410-3583 |
| .01uf, 250V Disc | 200-2122 |
| See Input Chart | |
| .01uf, 50V Disc | 200-0416 |
| 2200uf, 25V Elec | 203-0207 |
| .01uf, 1KV Disc | 200-2121 |
| 27pf, 500V DM10 | 208-5404 |
| .001uf, 7.5KV Disc | 200-7224 |
| Air Variable | 204-2572-1 |
| 210uf, 470V | 203-0578 |
| .1uf, 25/50V Disc | 200-0754 |
| 365pf, 500V DM19 | 208-5688 |
| 500pf, 500V DM15 | 208-5691 |
| Air Variable | 204-2113 |
| 150pf, 500V DM15 | 208-5396 |
| Bridge rectifier | 300-9646 |
| IN4007 | 300-0266 |
| MV6753 Red LED | 320-0522-1 |
| IN5408 | 300-0145 |
| IN34A | 300-0346 |
| SO-239 | 610-2126 |
| Single Phono Jack | 600-1225 |
| See Input Chart | |
| Choke Filament | 10-15115 |
| 2.5mH Choke | 402-1162 |
| 5½ turns Plate Choke | 10-15139 |
| #16 Air Coil | 404-0811 |
| HF Coil | 10-13140 |
| Plate V/I Meter | 400-2601 |
| Plate Current Meter | 400-2600 |
| 33 ohm, ¼W | 100-0403 |
| 50K, 7W Type 170S | 103-7580 |
| 1 Meg, 3W | 103-2223 |
| 1.5 ohm, 3W Type 135 | 103-3400 |
| .6 ohm, 3W Type 135 | 103-3399 |
| 330 ohm, ¼W | 100-0330 |
| 180 ohm, ¼W | 100-0120 |
| 3.3K ohm, ¼W | 100-0729 |
| 10K ohm, ½W | 101-0645 |
| 100K ohm, Pot | 105-1341 |
| 12V DC Relay | 408-6140 |
| Wafer Switch | 500-4811 |
| Band Switch | 500-2811 |
| SPST Switch | 503-1147 |
| Safety Interlock Switch | 504-3247 |
| Power Transformer | 406-1532 |
| 811A tube | 350-0811 |



15/17 METER TUNING NOTICE FOR AL-80B / AL-572

The AL-80B has two jumpers located on the Input Filter Board. To operate on both 15 and 17 meters these jumpers must be removed to have a reasonable in between VSWR match on the input of the AL-80B. The AL-572 has one jumper, located on the Input Filter Board, that must be removed to operate on both 15 and 17 meters. This is also done to have a reasonable in between VSWR match on the input of the AL-572. Refer to the figure below for the location of the jumpers that need to be removed. After removing the jumper(s) check for foreign objects in the amplifier and replace the cover.

The 15 and 17 meter input coil must now be tuned for a low VSWR. Use a .1 inch hex head non-conductive tuning tool to tune the coil through the back of the amplifier. First set your transceiver to a frequency in the 15 meter band and tune the amplifier. While the amplifier is keyed adjust the 15/17 meter coil for a low VSWR to the transceiver. Next, set your transceiver to a frequency in the 17 meter band and tune the amplifier. Check the VSWR to the transceiver. If the VSWR is high, slightly readjust the 15/17 meter coil for a reasonable VSWR. It may be necessary to tune to an average to get a reasonable VSWR on both bands.



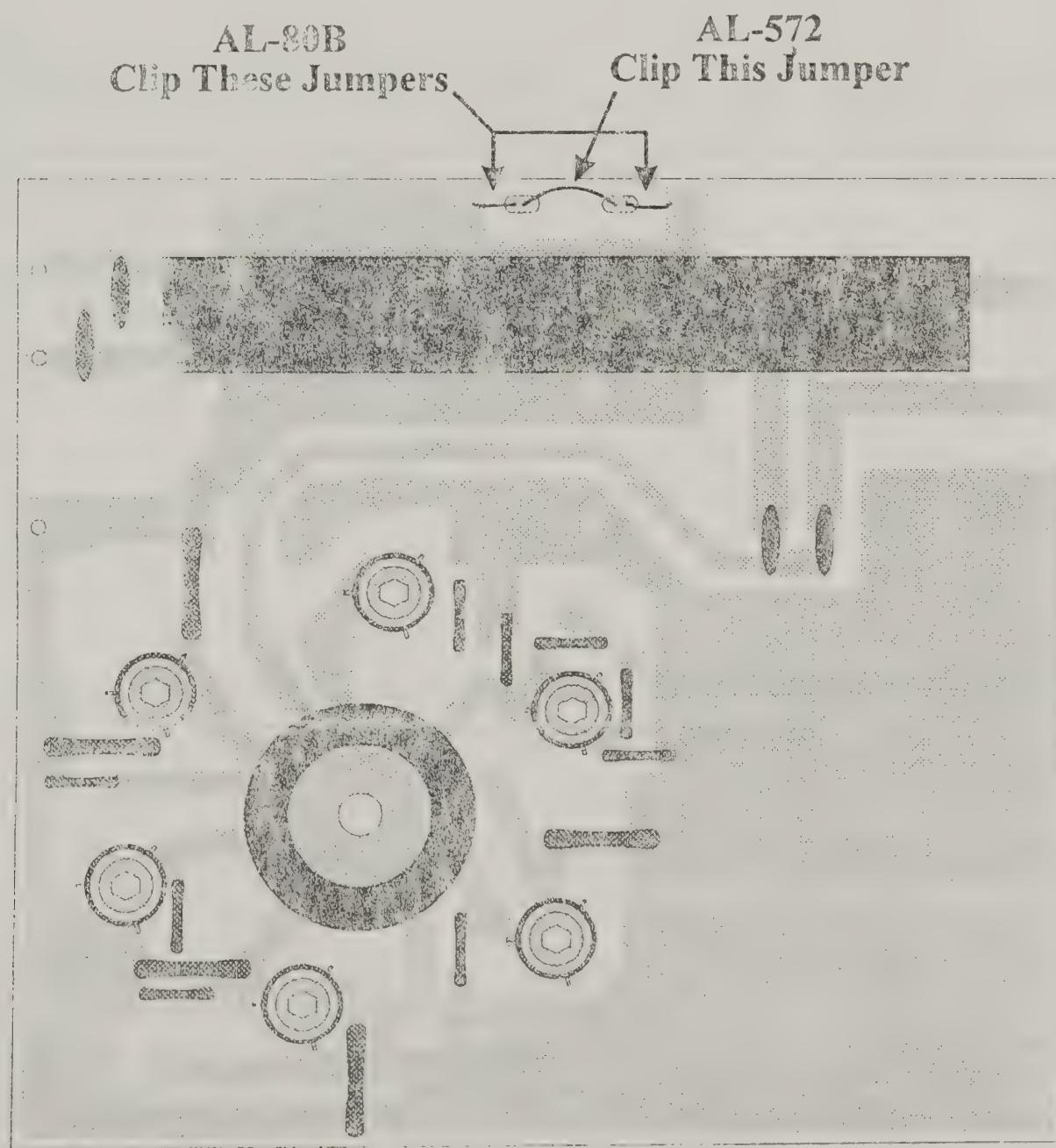
Input Filter Board

AMERITRON

15/17 METER TUNING NOTICE FOR AL-80B / AL-572

The AL-80B has two jumpers located on the Input Filter Board. To operate on both 15 and 17 meters these jumpers must be removed to have a reasonable in between VSWR match on the input of the AL-80B. The AL-572 has one jumper, located on the Input Filter Board, that must be removed to operate on both 15 and 17 meters. This is also done to have a reasonable in between VSWR match on the input of the AL-572. Refer to the figure below for the location of the jumpers that need to be removed. After removing the jumper(s) check for foreign objects in the amplifier and replace the cover.

The 15 and 17 meter input coil must now be tuned for a low VSWR. Use a .1 inch hex head non-conductive tuning tool to tune the coil through the back of the amplifier. First set your transceiver to a frequency in the 15 meter band and tune the amplifier. While the amplifier is keyed adjust the 15/17 meter coil for a low VSWR to the transceiver. Next, set your transceiver to a frequency in the 17 meter band and tune the amplifier. Check the VSWR to the transceiver. If the VSWR is high, slightly readjust the 15/17 meter coil for a reasonable VSWR. It may be necessary to tune to an average to get a reasonable VSWR on both bands.



Input Filter Board

10/12 METER MODIFICATION INSTRUCTIONS

AL-80 (not A)

The AL-80 (not A) needs a kit to modify the unit to 10/12 meters. Write to us for details. All other units DO NOT require a kit, only the following written instructions.

AL-80A

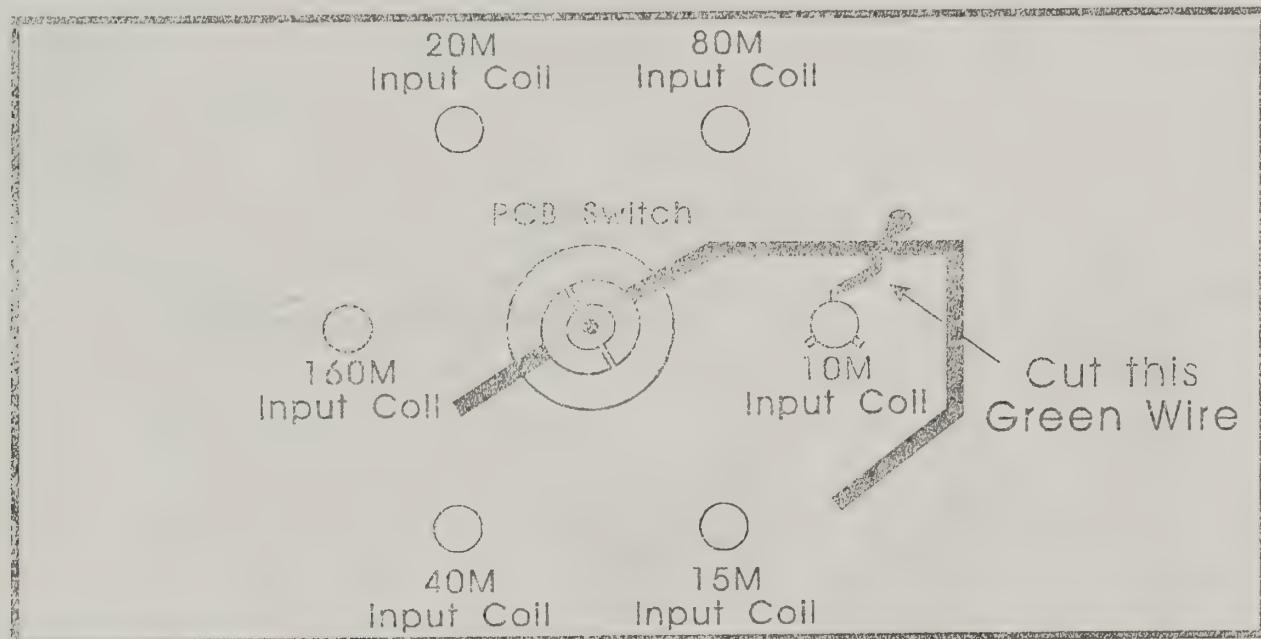
To obtain 10/12 meters on your AL-80A, cut the green wire that exits the subchassis at the front panel end of the bandswitch. This wire connects to the ground lug under the top mounting screw of the plate tuning capacitor reduction drive.

AL-80B / AL-811 / AL-811H / AL-572

To modify these amplifiers for 10/12 meter use follow these steps:

1. Remove the top. Locate the Rear Panel P.C. Board.
2. Locate the green wire that is connected from the P.C. board to one of the coils as depicted in the diagram below. Cut the green wire.
3. Replace the top.

NOTE: Input Circuit Tuning. If high SWR occurs at the input of the amplifier, adjust the tune-input circuit with a 0.1 inch hex T.V. Tuning Tool. Adjust the slug for low SWR when the amplifier is transmitting and tuned properly.



AL-80B / AL811 / AL811H Rear Panel PC Board

AL-82 / AL-1200 / AL-1500

To obtain 10/12 meters on your AL-82, AL-1200, or AL-1500 cut the green wire at the front of the band switch.

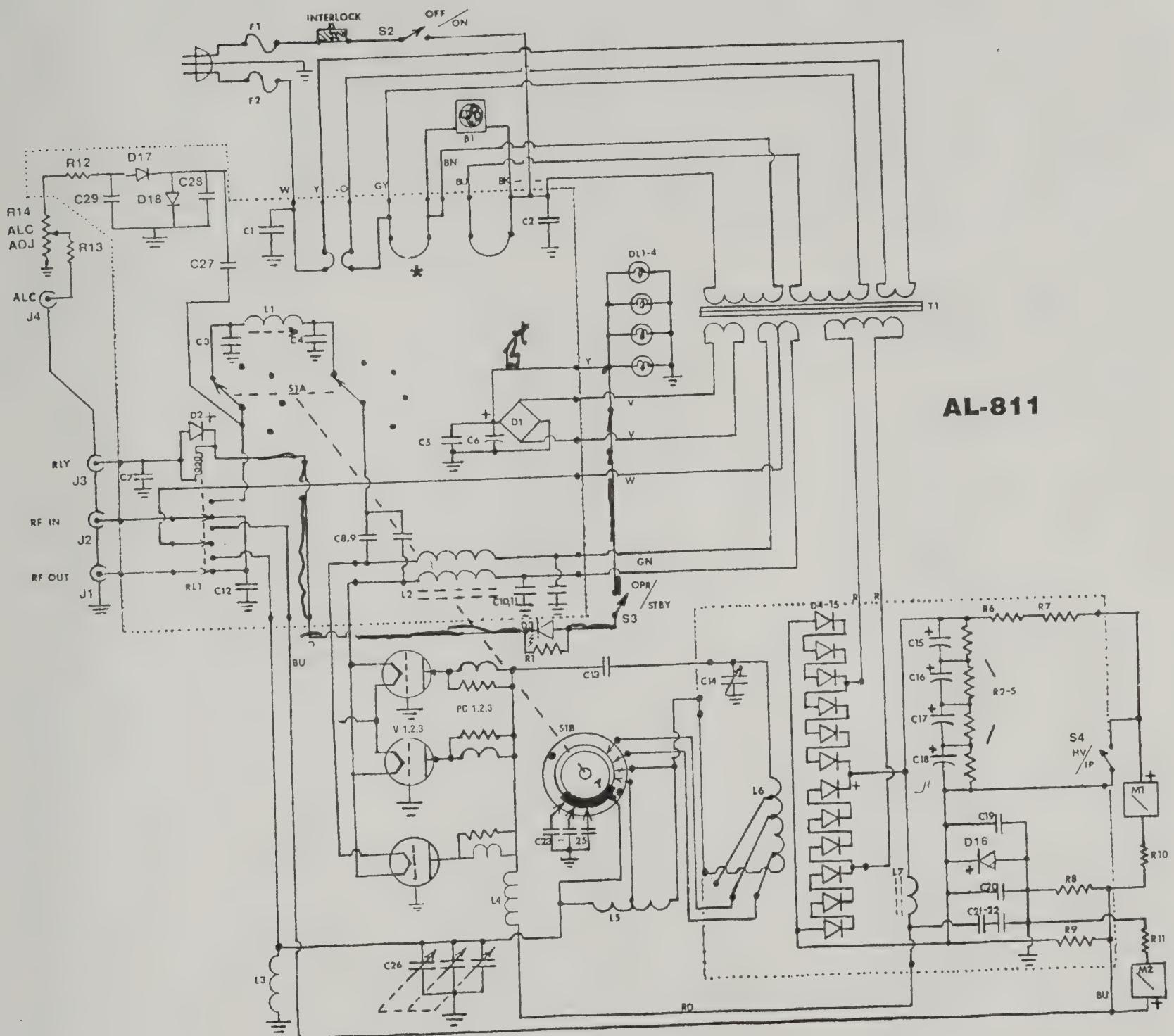
AL-800 / AL-800H

1. Place the amplifier onto a level surface so the back is easily accessible.
2. Locate the cover that is marked INPUT TUNING on the back of the amplifier.
3. Remove the four screws that secures the cover to the back panel.
4. Remove the cover from the back panel to expose the tune input circuit.
5. Locate the green wire that is soldered to the PC board.
6. Remove the wire by either: un-soldering or using a pair of wire cutters. Cut the wire short enough so the end will not shift and short against anything. (It may be necessary to remove the wire at both ends.)
7. Replace the cover back onto the amplifier and secure the screws.

The amplifier is now modified for 10/12 Meters. Use the AUX position on the Band Switch for 10/12 Meter operation.

AL-811 SCHEMATIC

Power supply shown wired for 120V operation *





| AL-811 INPUT CHART | | | |
|--------------------|----------------|------------------|-----------------|
| BAND | C3 (PF) | L1 | C4 (PF) |
| 160 | | 28.75T(405-1287) | 1300 (208-5177) |
| 80 | | 23.75T(405-1237) | 500 (208-5691) |
| 40 | 750 (208-5668) | 13.75T(405-1137) | 500 (208-5691) |
| 20 | 330 (208-5331) | 9.75T(405-1097) | 180 (208-5605) |
| 15 | 270 (208-5775) | 6.75T(405-1067) | 150 (208-5396) |
| 10 | 180 (208-5605) | 4.75T(405-1047) | 100 (208-5174) |

PARTS LIST

Designation:

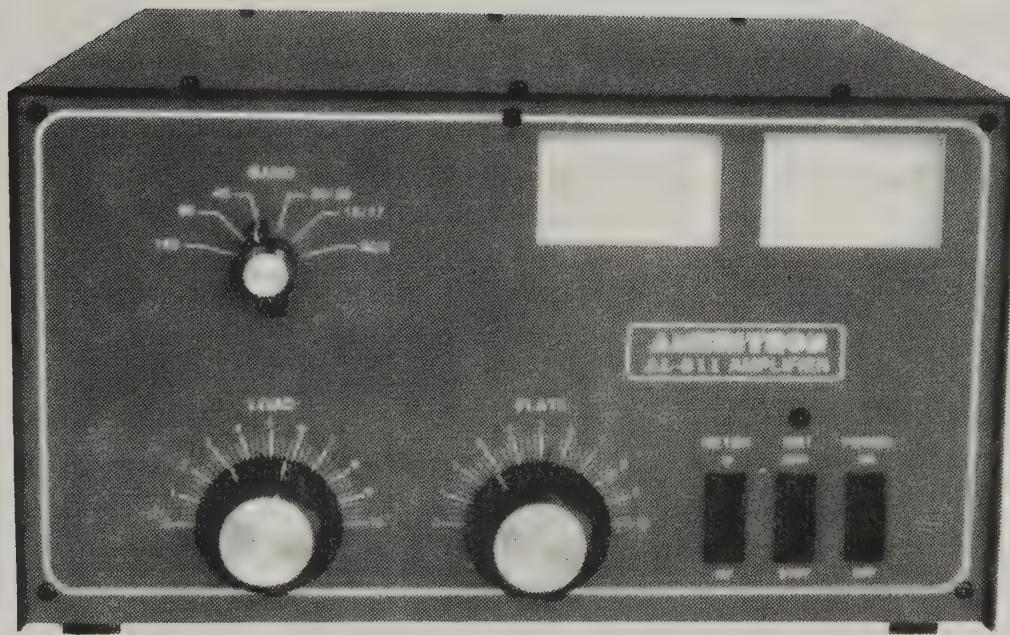
B1
 C1, 2, 21, 22
 C3, 4
 C5, 7, 19
 C6
 C8, 9, 10, 11, 29
 C12, 27
 C13
 C14
 C15, 16, 17, 18
 C20
 C23, 25
 C24
 C26
 C28
 D1
 D2, 16
 D3
 D4 - 15
 D17, 18
 J1, 2
 J3, 4
 L1
 L2
 L3
 L4
 L5
 L6
 M1
 M2
 R1
 R2, 3, 4, 5
 R6, 7
 R8
 R9
 R10
 R11
 R12
 R13
 R14
 RL1
 S1A
 S2B
 S2, 3, 4
 S5
 T1
 V1, 2, 3

Description:

Fan 410-3583
 .01uf, 250V Disc 200-2122
 See Input Chart
 .01uf, 50V Disc 200-0416
 2200uf, 25V Elec 203-0207
 .01uf, 1KV Disc 200-2121
 27pf, 500V DM10 208-5404
 .001uf, 7.5KV Disc 200-7224
 Air Variable 204-2572-1
 210uf, 470V 203-0578
 .1uf, 25/50V Disc 200-0754
 365pf, 500V DM19 208-5688
 500pf, 500V DM15 208-5691
 Air Variable 204-2113
 150pf, 500V DM15 208-5396
 Bridge rectifier 300-9646
 IN4007 300-0266
 MV6753 Red LED 320-0522-1
 IN5408 300-0145
 IN34A 300-0346
 SO-239 610-2126
 Single Phono Jack 600-1225
 See Input Chart
 Choke Filament 10-15115
 2.5mH Choke 402-1162
 5½ turns Plate Choke 10-15139
 #16 Air Coil 404-0811
 HF Coil 10-13140
 Plate V/I Meter 400-2601
 Plate Current Meter 400-2600
 33 ohm, ¼W 100-0403
 50K, 7W Type 170S 103-7580
 1 Meg, 3W 103-2223
 1.5 ohm, 3W Type 135 103-3400
 .6 ohm, 3W Type 135 103-3399
 330 ohm, ¼W 100-0330
 180 ohm, ¼W 100-0120
 3.3K ohm, ¼W 100-0729
 10K ohm, ½W 101-0645
 100K ohm, Pot 105-1341
 12V DC Relay 408-6140
 Wafer Switch 500-4811
 Band Switch 500-2811
 SPST Switch 503-1147
 Safety Interlock Switch 504-3247
 Power Transformer 406-1532
 811A tube 350-0811

AMERITRON AL-811

HF POWER LINEAR AMPLIFIER INSTRUCTION MANUAL



The Ameritron AL-811 is an economical 600 watt output linear amplifier that operates reliably from 160 through 15 meters. The AL-811 uses three 811A tubes in a class AB2 grounded grid circuit. Heavy duty power supply and RF components provide a long service life for components. The AL-811 is shipped factory wired for 120 volt, 50/60 Hz power mains. The AL-811X export model is shipped factory wired for 240 volt, 50/60 Hz power mains.

AMERITRON
116 Willow Road
Starkville, MS 39759

PLEASE READ THIS MANUAL BEFORE ATTEMPTING TO OPERATE EQUIPMENT

UNPACKING INSTRUCTIONS

1. Carefully lift the amplifier by the bottom cabinet edge out of the shipping carton. Place the amplifier on a firm, level surface and carefully inspect it for shipping damage. Contact the shipper immediately if any damage exists. This carton has been designed for maximum protection of the amplifier during transit. Save the carton and packing material for shipping in the future.
2. Remove all screws holding the cover on with a number 2 phillips screwdriver. Carefully lift the cover off the amplifier. Save the screws to resecure the cover.
3. Locate the fuse pack with the two 12 amp fuses and fuse caps . If additional screws are needed, they will be in the fuse pack also. **NOTE: Fuses supplied are for 120/110/100V operation. If you are rewiring the AL-811 for 240/230/220V operation, you must use 6 amp fuses.** The AL-811X export model is pre-wired for 240 V operation and is supplied with 6 amp fuses.
4. Remove the foam packing material (left side, front view) that secures the 811A tubes during transit. Carefully unwrap the tubes. Do not dislodge or break the fiber shaft that is connected to the rear input bandswitch wafer.
5. To install the tubes in the sockets be sure the large diameter pins line up with the two large diameter holes in each socket. Do NOT rock or twist the tubes excessively during the installation. If the tubes are already installed, check the tubes for proper seating. If necessary, press the tubes down into their sockets with gentle force. Do not rock or twist the tube(s) excessively. Also check that the anode caps are secure and did not come loose during the unwrapping process.
6. The white ceramic anode connectors will have to be removed from the top metal cap of each tube if it ever becomes necessary to remove the tubes from the amplifier. This can be a difficult procedure because of the high clamping force of the internal springs in the anode connector may hold it to the tube cap very tightly. The tube will break if direct upward or rocking pressure is applied in an attempt to remove the connector. The safest way to remove the ceramic connector is to lift the tube out of its socket. A twisting or spinning pulling motion can then be applied while holding the ceramic connector firmly until the tube and connector are seperated. Repeat the procedure for the other tubes.
7. Install the cover with the vent holes to the left (near the tubes) by installing the back screws first. Install all the screws loosely and tighten them only after all the screws are in place.
8. Install the fuses and fuse caps on the back of the unit. Read the manual to become familiar with the operation of the AL-811 amplifier.

AL-811 LINEAR AMPLIFIER

FEATURES

The AL-811 is a grounded grid linear amplifier developed by Ameritron using low cost 811A power triodes. It operates in class AB2 for SSB and CW.

- 1. Fast Warm Up Time:** The 811A tubes take approximately 3 seconds to warm-up.
- 2. Long Tube Life:** The 811A tubes are long life, reliable transmitting tubes. 811A tubes offer operation even on RTTY and SSTV.
- 3. Tuned Input:** A Pi-Network tuned input matches the 811A tubes to 50 ohm exciters.
- 4. Two Illuminated Panel Meters:** The AL-811 has two illuminated panel meters. The Grid Current meter provides a continuous reading of the 811A grid current to indicate proper loading of the amplifier. The other meter switches between High Voltage (HV) and Plate Current (Ip).
- 5. Safety Interlock:** AC is removed from the transformer when the cover is removed. **Never attempt to defeat this switch.**
- 6. Operate/Standby Switch:** Used to remove the Amplifier from the RF line while filament and plate voltages are maintained for "barefoot" operation.
- 7. XMT Indicator LED:** Provides a front panel indication of proper amplifier keying by the exciter during operation.
- 8. ALC Voltage:** The drive level is detected to provide a negative control voltage for the exciter. ALC prevents overdriving of the linear and reduces distortion from excessive drive power.

CAUTION: This amplifier must be disconnected from the power mains before removing the cover. See the precaution on Page 7.

TECHNICAL SPECIFICATIONS AL-811*

Frequency Coverage

Domestic model(AL-811): 160, 80, 40, 30, 20, 17 and 15 meters

Export model(AL-811X): 160, 80, 40, 30, 20, 17, 15, 12 and 10 meters

Input

Circuit type: Pi-network, slug tuned coils

Maximum VSWR at resonance: 1.3:1

Minimum 2:1 VSWR bandwidth: 15%

Maximum drive power permissible: 85 watts

Typical drive for rated output: 55 watts

Output

Circuit type: Pi-network

1/2 hour carrier: 400 watts

30 second carrier: 550 watts

1/2 hour PEP two tone: 600 watts or better

30 seconds PEP two tone: 600 watts or better

Efficiency: typically 70% or better

ALC

Negative going, 0-20V, adjustable, phono jack

Power Supply

Circuit type: full wave bridge

No load voltage: 1700 V

Full load voltage: 1500 V

Full load current: 550 mA

Regulation: 12%

Maximum draw at rated output: 8 A(120V)

AC Input: 120V, 50/60 Hz (AL-811)

240V, 50/60 Hz (AL-811X)

Metering

Multimeter: reads HV and plate current

Grid meter: reads PA grid current

Connectors

Relay: keys amplifier when grounded. Sources +12 VDC open circuit and supplies 100 mA when grounded. A built-in back-pulse cancelling diode protects the exciter.

RF input: SO-239 50 ohm input

RF out: 50 ohms with full power into any SWR below 3:1

Power: NEMA 5-15P 120V grounded style

Physical

Dimensions: 16" D x 13³/₄ W x 8" H

Weight: 30 lbs.

** specifications are subject to change without notice or obligation.*

GENERAL INFORMATION

SAFETY INTERLOCK

The interlock switch closes to allow AC line voltage to reach the power transformer as long as the AL811's top cover is in place. When the top cover is removed, the interlock opens and disconnects the line voltage. This does not discharge the bank of power supply filter capacitors. Be sure to allow the filter capacitors to discharge before you touch anything inside the Amplifier. You can select the High Voltage function of the Multimeter to check the high voltage potential. **WARNING: Never remove the cover of this amplifier with the unit plugged into the power line.**

DRIVING POWER

This Amplifier is designed to operate at full ratings when it is driven by an exciter that has approximately 70 watts of RF output. You can use an exciter that has lower output power, but the Amplifier's output may be less. If you use an exciter that delivers more than 70 watts, carefully adjust the driving power to avoid "over drive" and the creation of spurious signals, which create needless interference to other operators. We highly recommend that you use a monitor scope for continuous output monitoring. The display on an oscilloscope is the best readily available way of determining the amplitude of the voice peaks which, if excessive, can cause "flat topping" and splatter.

IMPORTANT: In no case should you advance the power output control of your exciter beyond the point where the amplifier's power output indication ceases to increase. Nonlinear operation may occur if you turn the control past this point.

FILAMENT SUPPLY

The filament circuit of this amplifier satisfies all requirements of the tube manufacturer related to tube performance and life. Inrush current is controlled by the transformer internal resistance and impedance, filament choke resistance and filament wiring resistance. To insure maximum life of the tube never replace any circuit components or wiring with substitute parts.

ALC CIRCUIT

The ALC circuit converts a portion of the RF drive voltage at the exciter end of the tuned input circuit to a negative going control voltage. This voltage should be used to limit the exciter drive to safe drive levels for the AL-811 for exciters that develop more than 70 watts of output power.

A capacitive divider consisting of C27 and C28 is used to reduce the RF voltage and drive a rectifier circuit consisting of D17 and D18. The resulting voltage is filtered by C29 and R12 and applied to the ALC potentiometer R14. R13 provides RF and DC isolation for the ALC jack. The DC isolation prevents loading of the exciter ALC input line by the ALC potentiometer.

The ALC circuit can be adjusted by loading the AL-811 slightly beyond the recommended maximum values with the ALC line disconnected. The ALC line can then be connected and the ALC control on the amplifier adjusted to a point just before the drive begins to decrease.

NOTE: The primary use of the ALC function is the prevention of excessive drive levels. This circuit will not prevent small changes in output power from occurring on different bands. Destructive levels of drive power are those above 100 watts under most conditions. Slight changes may occur in maximum output power on different frequencies with the ALC connected. A compromise in ALC adjustment may be necessary to achieve acceptable performance on all bands.

PLATE SUPPLY

The power supply in this amplifier uses a combination plate, filament and control transformer. A buck boost winding is provided to allow the user to compensate for low, medium or high power line voltages. This amplifier is normally supplied wired for the highest power line voltage setting. Never change this setting unless you are positive that performance is suffering due to low filament and plate voltages. The life of components will be shortened drastically if the high voltage exceeds 1800 volts at rest. The diagram on page 4 shows proper wiring for each voltage.

EXPORT MODIFICATIONS

A simple modification will allow operation on frequencies above 15 meters. Instructions for this modification are available by sending a written request for "Export Modification Instructions" along with a copy of a valid amateur license. There is no charge for this information. Export models are shipped with this modification and have an "X" following the serial number. Standard frequency coverages are indicated in the chart on page 7.

TECHNICAL ASSISTANCE

Technical assistance is available during our normal business hours on weekdays. The following information is required to assist you with operational problems:

1. Model and Serial Number
2. Date of purchase and dealer
3. An accurate description of the problem

Meter readings at all stages of the tuning procedure are very important along with a complete description of the other equipment used with our product.

Written assistance is also available. Due to time delays in processing mail, please allow at least three weeks for a written reply.

AMERITRON
116 Willow Road
Starkville, MS 39759
Telephone-(601) 323-8211

METERING FUNCTIONS

The AL-811 has two illuminated panel meters. The right meter reads PA grid current up to 200mA. The normal current with a single tone (carrier) signal will be around 150 mA. If the current is too high during full power operation, the loading control should be advanced to a higher setting. If the current is too low, the loading control should

be turned to a lower setting.

The left meter reads PA high voltage of 2000 volts and plate current of 750 mA. The normal readings are 1500-1700 volts HV and 550 mA of current at full rated output with a single tone signal.

INSTALLATION

LOCATION

Do not operate the Amplifier in excessively warm locations or near heating vents or radiators. Be sure air can circulate freely around and through the Amplifier cabinet. Provide an unobstructed air inlet for the blower. Do NOT place any books, magazines or equipment that will impede the free flow of air near the sides of the cabinet.

VENTILATION

The AL-811 ventilation system has been designed and tested to maintain the 811A tube temperature safely below the tube manufacturer's rating at 500 watts output with a 100% duty cycle. To insure proper ventilation in your installation, observe the following:

1. Do not block or restrict the ventilation holes in the cover.
2. The exhaust air flow is over 20CFM. Do not "assist" the air flow unless the fan exceeds the AL-811 fan CFM by a factor of 2:1.
3. Do not mount additional fans on the AL-811 cabinet.
4. The exhaust air will become warm at high power levels. Do not place any heat sensitive objects in the exhaust air stream.

GROUNDING

Connect a good earth or water pipe ground to the ground post on the rear panel of the Amplifier. Use the heaviest and shortest connection possible.

Before you use a water pipe ground, inspect the connections around the water meter and make sure that no plastic or rubber hose connections are used. These connections interrupt electrical continuity to the water supply line. Install a jumper around any insulating water connections you may find. Use heavy copper wire and pipe clamps. It is best to ground all equipment to one point at the operating position and then ground this point as described above.

POWER CONNECTIONS

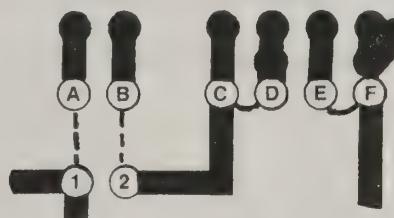
The AL-811 is supplied with a NEMA 5-15P plug for 120V operation. The power required to operate the AL-811 is not high enough to warrant 240V operation unless 120V

is not available. The fuses should be 12 ampere fuses for 120V and must be changed to 6 amperes for 240V operation. The diagram below shows the proper wiring for 120V operation. Operation on a voltage of 240V is not required, nor will it necessarily improve performance. The power transformer will perform equally well with a power line frequency of 60 Hz or 50 Hz. The Transformer Connections chart at the bottom of this page shows proper connections for various line voltages.

The AL-811X (export model) is wired for 240V, 50/60 Hz operation. The appropriate plug is not provided for this model. You must wire the proper plug on the end of the power cord supplied. Simply cut the existing plug off and wire the appropriate plug in its place. If the line voltage in your country is not 240V, then you must change the transformer to the appropriate setting indicated by the chart below. Note: the AL-811 transformer allows operation on 100V line voltage in countries such as Japan.

NEVER REWIRE THE POWER SUPPLY TO BOOST THE HIGH VOLTAGE ABOVE 1800 VOLTS.

The wiring between the fuse box and the amplifier AC outlet must be 14 gauge or larger in order to supply the operating current required (8 amperes) without a significant drop in the line voltage. The outlet should be fused for the wire gauge used.



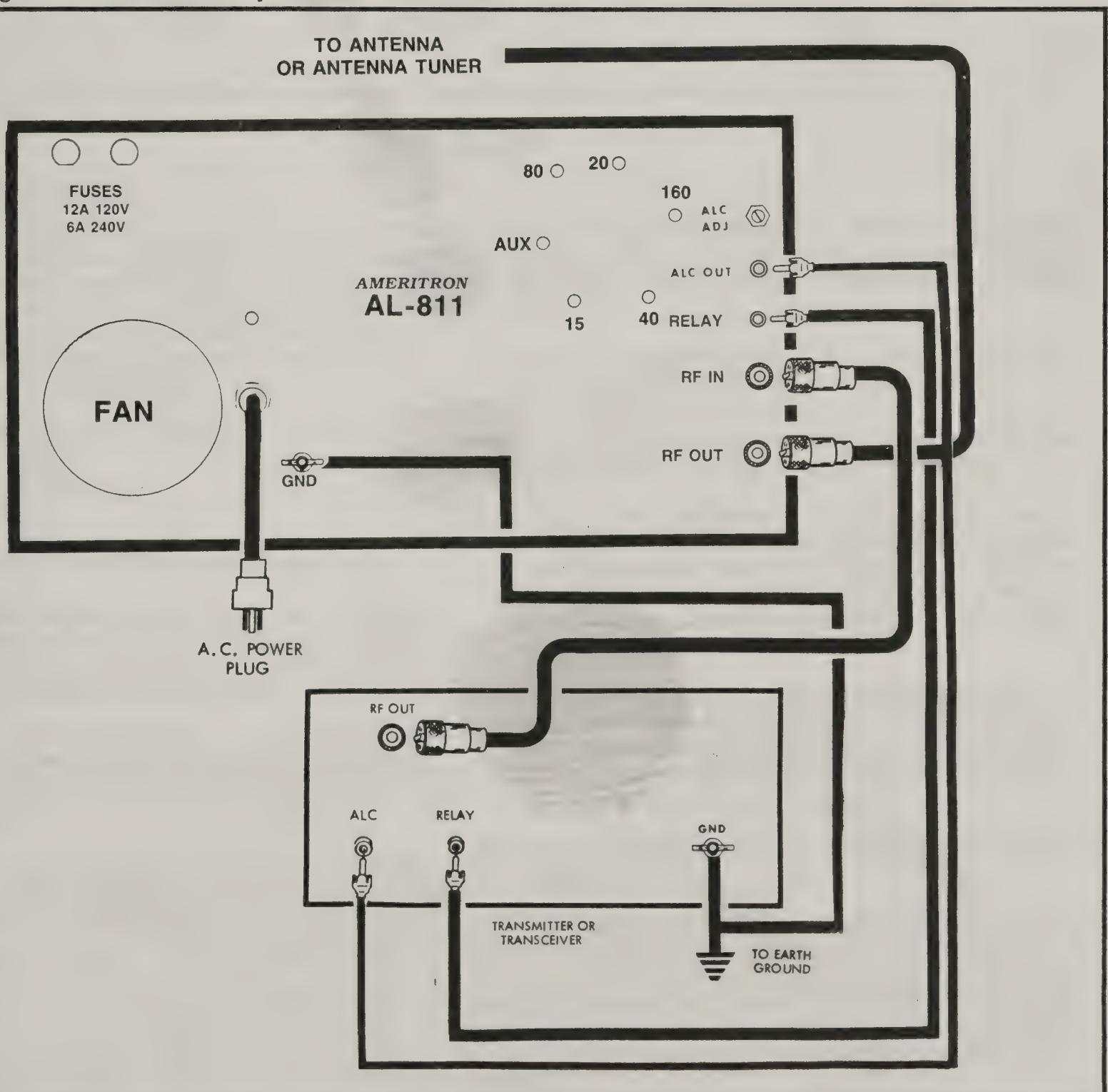
* Factory wired operation for the AL-811

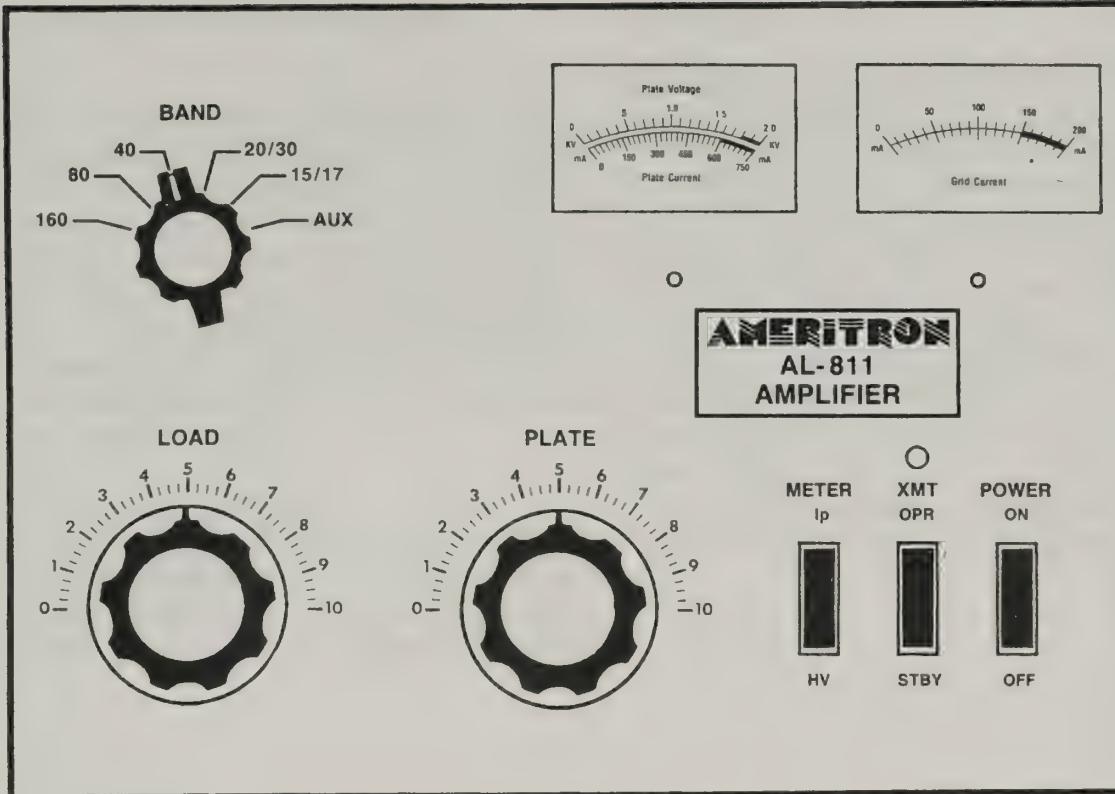
** Factory wired operation for the AL-811X

| VOLTAGE | BUCK BOOST | PRIMARY |
|---------|--------------------|-----------------|
| *120 | A to 1, B to 2 | C to D, E to F |
| 110 | 1 to 2, (A,B open) | C to D, E to F |
| 100 | A to 2, B to 1 | C to D, E to F |
| **240 | A to 1, B to 2 | C no connection |
| 230 | 1 to 2 (A,B open) | D to E |
| 220 | A to 2, B to 1 | F no connection |

INTERCONNECTIONS

1. Connect the RF output of the transmitter to the RF IN connector on the rear of the AL-811 with 50 ohm coax. Use any 50 ohm cable (RG-58 is fine) with PL-259 plugs.
2. Connect the existing station antenna system to the RF OUT connector on the AL-811 with any 50 ohm coaxial cable capable of carrying 500 watts.
3. Use shielded audio type cable with standard male phono plugs to connect the RELAY jack on the AL-811 to the exciter's normally open amplifier keying circuit. The keying circuit in the AL-811 has positive 12 VDC open circuit and provides 100 mA of current when pulled to ground. The AL-811 has an internal back-pulse cancelling diode across the relay coil.
4. Connect the shortest ground lead possible from a good earth ground to the GND terminal. The best leads are solid (instead of stranded or braided) copper. It is also best to use a common ground point for all the equipment in the station.
5. Use a shielded audio cable with a standard male phono plug to connect the ALC jack to the negative going ALC input jack on the exciter. *Do not connect this line until you have read and understand the function of the ALC circuit.* Exciters with output powers below 70 watts do not normally require this connection. If this jack is connected without adjusting the ALC control, the exciter may not develop any drive power.





TUNE-UP

CW PROCEDURE

Follow the instructions in numerical order. If the various meter readings are different than the instructions, check the connections from the exciter to the amplifier and make sure they are correct. Consult the manual for the exciter if necessary. Be sure the transformer is correctly wired for your line voltage. See the "Power Connection" instructions on page 4 for wiring details.

1. Set the AL-811 front panel switches as follows:
OFF-ON to OFF
OPR-STBY to STBY
Ip-HV to HV
2. Plug the line cord into the proper voltage outlet.
3. Set the power switch to the **ON** position. The meter lamps should light and the fan should start. Read the 2000 volt scale on the multimeter. It should indicate 1700 volts nominal and no more than 1800 volts.
4. With the amplifier still on **STBY**, tune the exciter into the normal 50 ohm load according to the manufacturer's instructions. Turn the exciter drive fully down after tuning.
5. Place the amplifier bandswitch on the same band as the exciter, the **PLATE** control in the dial range for the band selected, and the **LOAD** control as indicated:

| MHz | Load | Plate | MHz | Load | Plate |
|------|------|-------|------|------|-------|
| 1.80 | 3 | 1 | 10.0 | 0 | 7 |
| 1.90 | 4 | 2 | 14.0 | 4½ | 8½ |
| 3.5 | 3 | 4½ | 18.1 | 4 | 8½ |
| 3.7 | 4 | 5 | 21.0 | 5 | 9 |
| 4.0 | 4½ | 5½ | 28.5 | 5 | 9½ |
| 7.0 | 4½ | 7½ | | | |
| 7.3 | 4½ | 7½ | | | |

6. With the exciter drive still at zero, place the **HV-Ip** switch in the **Ip** position. Observe the 750 mA scale. It should read zero. Place the **STBY-OPR** switch in the **OPR** position.
7. Key the exciter (no drive). The Transmit (**XMT**) LED should light. Observe the plate current on the 750 mA scale. It should be 110 mA.
8. Apply only enough drive to indicate a grid current of 100 mA or an **Ip** of no more than 450 mA. Tune the **PLATE** control for maximum output power. It is normal for the plate current to dip at this point. *If the grid current goes over 150 mA, reduce the drive at once.* Unkey the exciter.
9. Observe the output on an external RF wattmeter. Increase the drive until full exciter power (never to exceed 100watts) or 150mA of grid current is achieved. Quickly adjust the **PLATE** and **LOAD** controls for maximum output power.
10. Reduce the drive until the desired output level is obtained.

NOTE: Rotating the **LOAD** control clockwise reduces grid current for a given amount of drive. If the **LOAD** control is set at too low a numerical setting, a severe stress on tank components may occur. The **PLATE** control should always be peaked for maximum grid current or output power. Do not exceed 700mA of plate current during tuneup.

OPERATION OF OTHER MODES

SSB:

Tune up the Exciter and Amplifier as described in "TUNE UP" section and switch the exciter to SSB. Normal ranges of meter readings on SSB are between 20 and 50 percent of the CW carrier readings. This is due to the different peak to average power ratios in the operators speech waveform. The only true way to measure peak output power is with a good peak reading wattmeter or monitor scope. A whistle should produce the same values obtained on CW. Any effort to run more than these values will produce splatter and distortion.

SSTV, FM, RTTY, PACKET, AMTOR:

The plate current should be limited to 400 mA maximum. The grid current should be limited to 120 mA and the amplifier tuned for peak output power with the drive reduced to hold the grid and plate currents below the ratings given.

NOTE:

Some excitors put out short duration high power RF pulses when first keyed. Exciter power output peaks may reach or exceed full output level settings even if the exciter's power control is adjusted to deliver a fraction of full power under "keydown" conditions.

The amplifier loading control must be set high enough (clockwise) to prevent extremely high energy levels from developing in the plate and grid circuits of the amplifier. **DO NOT "UNDERLOAD" THE AMPLIFIER TO REDUCE POWER.** Never "retune" the amplifier to produce higher efficiency with reduced drive except under the SSTV, FM, RTTY, PACKET, and AMTOR section. Poor linearity, splatter or even damage to components may result from failure to follow instructions.

The AL-811 will operate with full output on all WARC bands except 24.5 MHz. The AL-811X (export model) will operate with full output on all WARC bands.

STANDARD FREQUENCY COVERAGE

AL-811

| | |
|--------------|-----------------|
| 160 meters | 1.8 - 2.0 MHz |
| 80 meters | 3.3 - 4.4 MHz |
| 40 meters | 6.3 - 8.3 MHz |
| 30/20 meters | 9.5 - 15.5 MHz |
| 17/15 meters | 15.5 - 21.5 MHz |

AL-811X

| | |
|--------------|-----------------|
| 160 meters | 1.8 - 2.0 MHz |
| 80 meters | 3.3 - 4.4 MHz |
| 40 meters | 6.3 - 8.3 MHz |
| 30/20 meters | 9.5 - 15.5 MHz |
| 17/15 meters | 15.5 - 21.5 MHz |
| 12/10 meters | 24 - 29 MHz |

WARNING!!

DO NOT ATTEMPT TO PUT THIS AMPLIFIER IN SERVICE WITH THE COVER REMOVED! CONTACT WITH VOLTAGES INSIDE THIS AMPLIFIER CAN BE FATAL! ALWAYS DISCONNECT THE AMPLIFIER FROM THE POWER MAINS AND WAIT FOR THE FILTER CAPACITORS TO DISCHARGE BEFORE REMOVING THE COVER.

PERIODIC MAINTENANCE

The high voltage present on the plate choke and air variable capacitors attract dust and dirt out of the air stream. It is particularly important that the high voltage areas at the bottom of the plate choke and the insulators on the air variable capacitors be dust free. These areas should be inspected every few months if the amplifier is operated in a dusty environment. Unplug the line cord, and wait at least 90 seconds until the power supply

capacitors discharge. Remove the cover and connect a jumper wire from ground to the anode connection of the tubes. **NOTE: This is a safety wire that must be installed when beginning service work and removed when work is finished.**

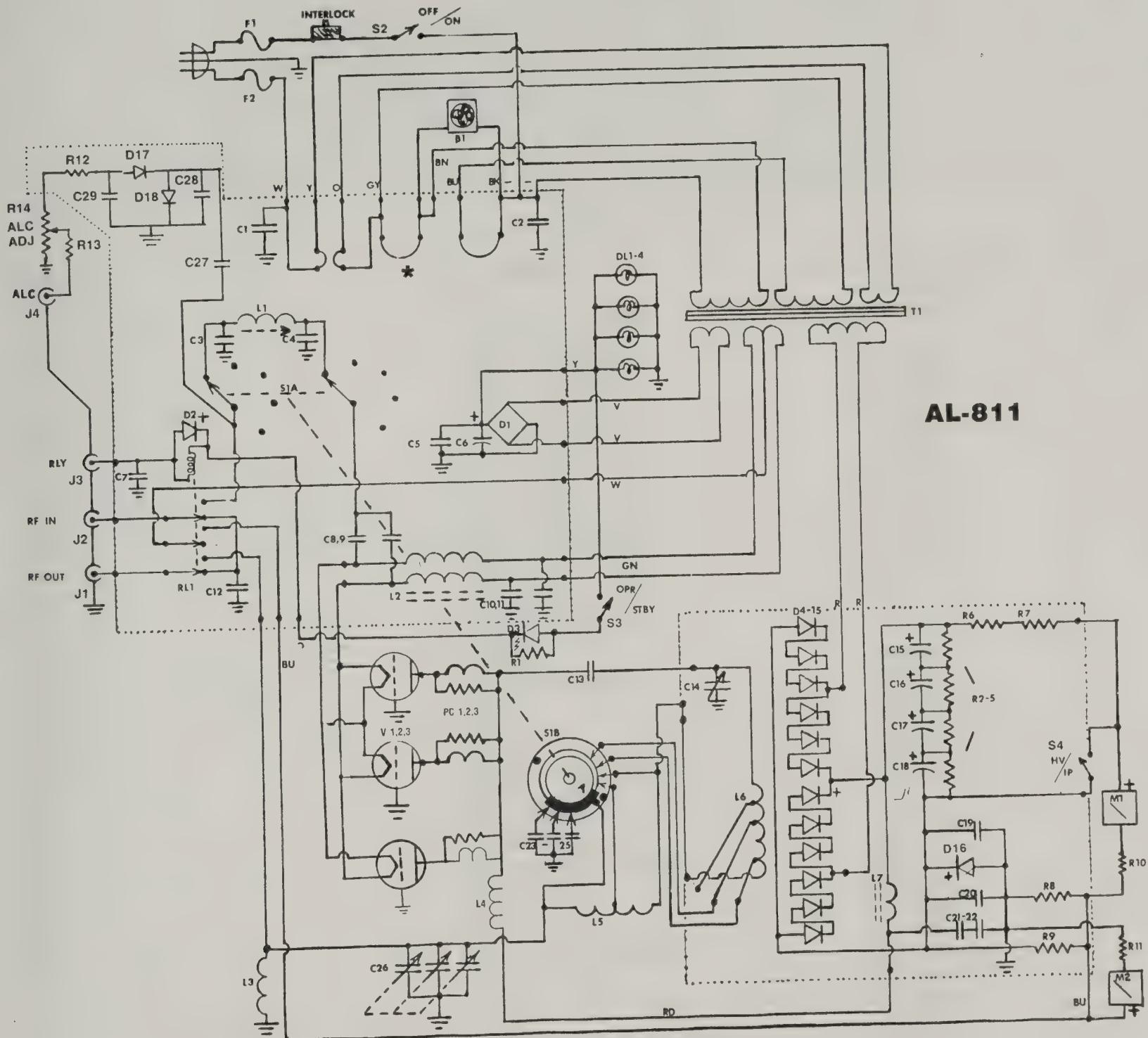
Use a soft bristle brush dipped in alcohol to clean areas mentioned previously.

NOTES:

| BAND | LOAD | PLATE |
|--------|------|-------|
| 160 | | |
| 80 CW | | |
| 75 SSB | | |
| 40 CW | | |
| 40 SSB | | |
| 30 CW | | |
| 30 SSB | | |
| 20 CW | | |
| 20 SSB | | |
| 17 | | |
| 15 CW | | |
| 15 SSB | | |
| | | |

Fill in this chart with your actual settings and you can quickly change bands. We suggest you use a pencil as settings may change as you alter your antennas.

AL-811 SCHEMATIC
Power supply shown wired for 120V operation *



| AL-811 INPUT CHART | | | |
|--------------------|----------------|------------------|-----------------|
| BAND | C3 (PF) | L1 | C4 (PF) |
| 160 | | 28.75T(405-1287) | 1300 (208-5177) |
| 80 | | 23.75T(405-1237) | 500 (208-5691) |
| 40 | 750 (208-5668) | 13.75T(405-1137) | 500 (208-5691) |
| 20 | 330 (208-5331) | 9.75T(405-1097) | 180 (208-5605) |
| 15 | 270 (208-5775) | 6.75T(405-1067) | 150 (208-5396) |
| 10 | 180 (208-5605) | 4.75T(405-1047) | 100 (208-5174) |

PARTS LIST

Designation:

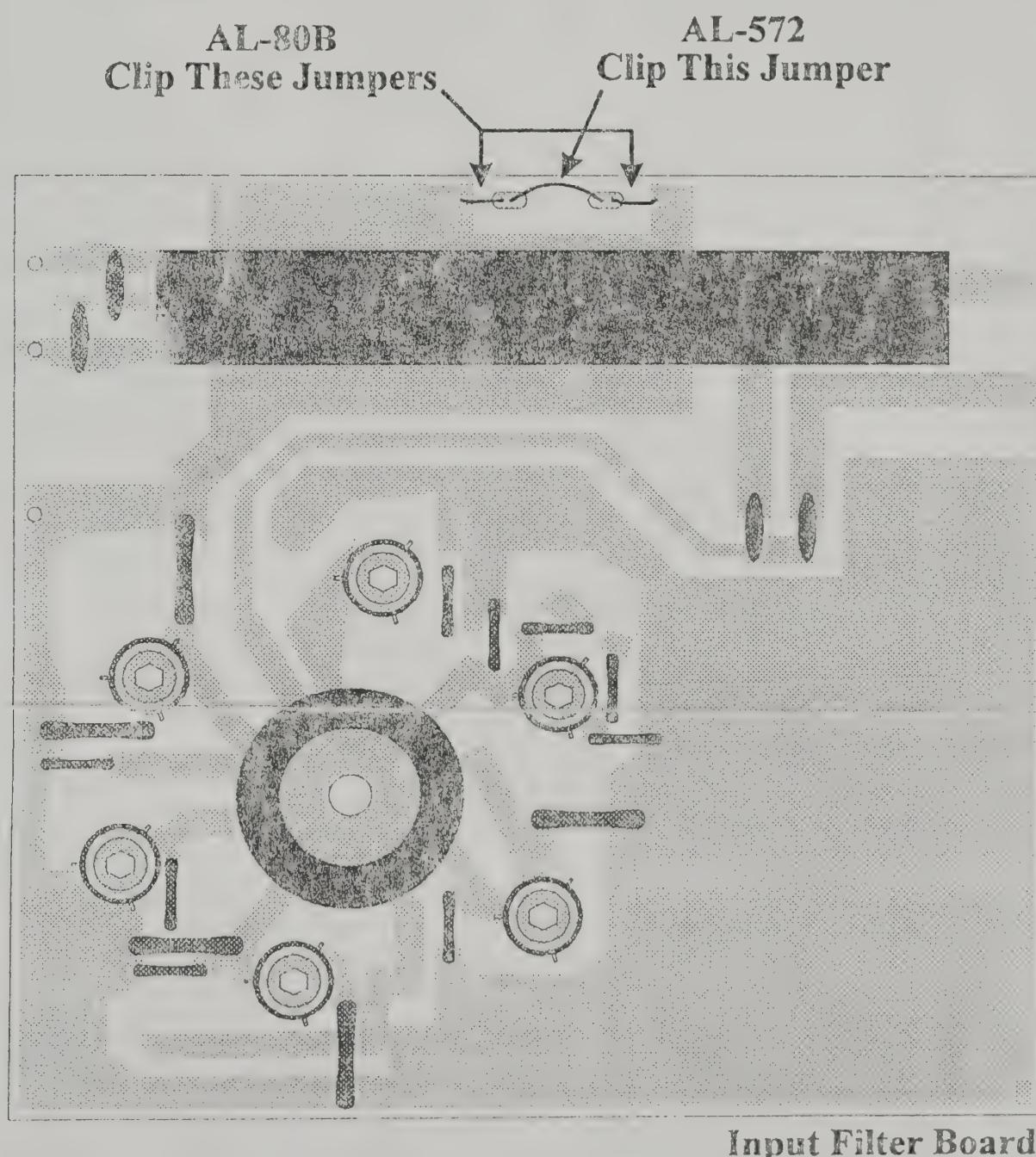
B1
 C1, 2, 21, 22
 C3, 4
 C5, 7, 19
 C6
 C8, 9, 10, 11, 29
 C12, 27
 C13
 C14
 C15, 16, 17, 18
 C20
 C23, 25
 C24
 C26
 C28
 D1
 D2, 16
 D3
 D4 - 15
 D17, 18
 J1, 2
 J3, 4
 L1
 L2
 L3
 L4
 L5
 L6
 M1
 M2
 R1
 R2, 3, 4, 5
 R6, 7
 R8
 R9
 R10
 R11
 R12
 R13
 R14
 RL1
 S1A
 S2B
 S2, 3, 4
 S5
 T1
 V1, 2, 3

| <u>Description:</u> | <u>Ameritron Part #:</u> |
|-------------------------|--------------------------|
| Fan | 410-3583 |
| .01uf, 250V Disc | 200-2122 |
| See Input Chart | |
| .01uf, 50V Disc | 200-0416 |
| 2200uf, 25V Elec | 203-0207 |
| .01uf, 1KV Disc | 200-2121 |
| 27pf, 500V DM10 | 208-5404 |
| .001uf, 7.5KV Disc | 200-7224 |
| Air Variable | 204-2572-1 |
| 210uf, 470V | 203-0578 |
| .1uf, 25/50V Disc | 200-0754 |
| 365pf, 500V DM19 | 208-5688 |
| 500pf, 500V DM15 | 208-5691 |
| Air Variable | 204-2113 |
| 150pf, 500V DM15 | 208-5396 |
| Bridge rectifier | 300-9646 |
| IN4007 | 300-0266 |
| MV6753 Red LED | 320-0522-1 |
| IN5408 | 300-0145 |
| IN34A | 300-0346 |
| SO-239 | 610-2126 |
| Single Phono Jack | 600-1225 |
| See Input Chart | |
| Choke Filament | 10-15115 |
| 2.5mH Choke | 402-1162 |
| 5½ turns Plate Choke | 10-15139 |
| #16 Air Coil | 404-0811 |
| HF Coil | 10-13140 |
| Plate V/I Meter | 400-2601 |
| Plate Current Meter | 400-2600 |
| 33 ohm, ¼W | 100-0403 |
| 50K, 7W Type 170S | 103-7580 |
| 1 Meg, 3W | 103-2223 |
| 1.5 ohm, 3W Type 135 | 103-3400 |
| .6 ohm, 3W Type 135 | 103-3399 |
| 330 ohm, ¼W | 100-0330 |
| 180 ohm, ¼W | 100-0120 |
| 3.3K ohm, ¼W | 100-0729 |
| 10K ohm, ½W | 101-0645 |
| 100K ohm, Pot | 105-1341 |
| 12V DC Relay | 408-6140 |
| Wafer Switch | 500-4811 |
| Band Switch | 500-2811 |
| SPST Switch | 503-1147 |
| Safety Interlock Switch | 504-3247 |
| Power Transformer | 406-1532 |
| 811A tube | 350-0811 |

15/17 METER TUNING NOTICE FOR AL-80B / AL-572

The AL-80B has two jumpers located on the Input Filter Board. To operate on both 15 and 17 meters these jumpers must be removed to have a reasonable in between VSWR match on the input of the AL-80B. The AL-572 has one jumper, located on the Input Filter Board, that must be removed to operate on both 15 and 17 meters. This is also done to have a reasonable in between VSWR match on the input of the AL-572. Refer to the figure below for the location of the jumpers that need to be removed. After removing the jumper(s) check for foreign objects in the amplifier and replace the cover.

The 15 and 17 meter input coil must now be tuned for a low VSWR. Use a .1 inch hex head non-conductive tuning tool to tune the coil through the back of the amplifier. First set your transceiver to a frequency in the 15 meter band and tune the amplifier. While the amplifier is keyed adjust the 15/17 meter coil for a low VSWR to the transceiver. Next, set your transceiver to a frequency in the 17 meter band and tune the amplifier. Check the VSWR to the transceiver. If the VSWR is high, slightly readjust the 15/17 meter coil for a reasonable VSWR. It may be necessary to tune to an average to get a reasonable VSWR on both bands.



AL-80 (not A)

The AL-80 (not A) needs a kit to modify the unit to 10/12 meters. Write to us for details. All other units DO NOT require a kit, only the following written instructions.

AL-80A

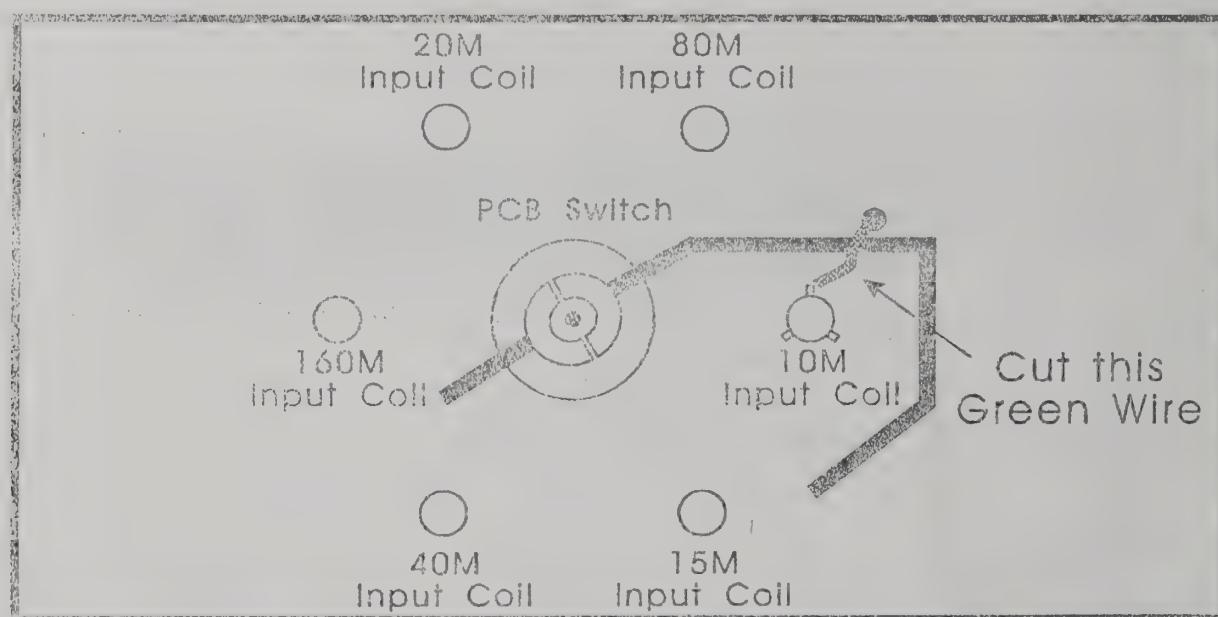
To obtain 10/12 meters on your AL-80A, cut the green wire that exits the subchassis at the front panel end of the bandswitch. This wire connects to the ground lug under the top mounting screw of the plate tuning capacitor reduction drive.

AL-80B / AL-811 / AL-811H / AL-572

To modify these amplifiers for 10/12 meter use follow these steps:

1. Remove the top. Locate the Rear Panel P.C. Board.
2. Locate the green wire that is connected from the P.C. board to one of the coils as depicted in the diagram below. Cut the green wire.
3. Replace the top.

NOTE: Input Circuit Tuning. If high SWR occurs at the input of the amplifier, adjust the tune-input circuit with a 0.1 inch box T.V. Tuning Tool. Adjust the slug for low SWR when the amplifier is transmitting and tuned properly.



AL-80B / AL811 / AL811H Rear Panel PC Board

AL-82 / AL-1200 / AL-1500

To obtain 10/12 meters on your AL-82, AL-1200, or AL-1500 cut the green wire at the front of the band switch.

AL-800 / AL-800H

1. Place the amplifier onto a level surface so the back is easily accessible.
2. Locate the cover that is marked INPUT TUNING on the back of the amplifier.
3. Remove the four screws that secures the cover to the back panel.
4. Remove the cover from the back panel to expose the tune input circuit.
5. Locate the green wire that is solder to the PC board.
6. Remove the wire by either: un-soldering or using a pair of wire cutters. Cut the wire short enough so the end will not slide and slip it against anything. (It may be necessary to remove the wire at both ends.)
7. Replace the cover back onto the amplifier and secure the screws.

The amplifier is now modified for 10/12 Meters. Use the AUX position on the Band Switch for 10/12 Meter operation.

For your personal safety, please observe the following precautions:

1. **NEVER** defeat the interlock.
2. **NEVER** remove the cover with the amplifier connected to the power line.
3. **ALWAYS** allow several minutes for the capacitors to discharge *after* unplugging the amplifier and *before* removing the cover.
4. **ALWAYS** select the high-voltage (HV) function of the Multimeter to check the high voltage potential. Do **not** remove the cover if voltage is indicated.
5. **ALWAYS** ground the tube anode (top metal conductor) to the chassis before touching anything inside the amplifier.
6. **ALWAYS** be cautious of heat. Many components inside the amplifier operate at high temperatures.
7. **NEVER** make any unauthorized component or circuit modifications to this product. The *only* acceptable source for modifications is Ameritron or a source approved by Ameritron. Unauthorized modifications almost certainly will **increase** the risk of equipment failure or personal injury.

The cover should be removed and a low value (40 to 500 ohm) two-watt or larger resistor should be secured to the chassis. The other end of this resistor should be connected to the tube anode with an insulated clip lead.

CAUTION: NEVER ground the anode directly to the chassis without a series resistor. Component damage may occur from the current surge.

Note: This resistor is a safety device that must be installed when beginning service work and removed when the work is finished.

Dust and dirt can be blown out of the amplifier with a shop vacuum or a high pressure air hose. A soft bristle brush dipped in alcohol can be used to clean particularly dirty areas. If the amplifier is operated in a dusty environment, a non-conductive low-restriction foam air filter can be placed over the ventilation holes on the left side of the cabinet near the filter capacitors. Placing an air filter over these air inlet holes will substantially reduce the amount of dust entering the cabinet. Most hardware stores stock suitable air filter material that are used as replacement filters for window air conditioners.

Parts List**Power Supply / SWR Board (50-0080-1)**

| Designator | Description | Ameritron PN |
|--------------------------|-------------------------------------|--------------|
| D101,102,114,115 | 1N34A | 300-0346 |
| D103 | 1N757A Zener 9.1V | 305-0757 |
| D116-120 | 1N4001 | 300-0266 |
| D104-113 | 1N5408 | 300-0145 |
| C101 | 27 pF 500 V | 208-5404 |
| C102,105 | .001 uF 1 kV | 200-2120 |
| C103 | 10 pF 1 kV | 200-3531 |
| C104 | 3-12 pF 500 V Trim | 204-0150 |
| C106,125,126,129,135-137 | .01uF 50 V Disc | 200-0416 |
| C140 | .47 uF | 203-0530 |
| C107-116 | .01 uF 1 kV | 200-2121 |
| C117-124 | 210 uF 450 V Elect. | 203-0578 |
| C127 | 270 pF 500 V | 208-5775 |
| C128,138,132,139 | .1 uF 50 V | 200-0754 |
| C130,131 | .01 uF 250 Vac | 200-2122 |
| C133 | 2200 uF 25 V | 203-0207 |
| C134 | 220 uF 25 V | 203-0565 |
| R101 | 4.7k mox 1 W | 103-1747 |
| R102 | 470k 1/4 W | 100-0188 |
| R103,104,121 | 10k 1/4 W | 100-4100 |
| R105 | 10 ohm 1/2 W | 100-0727 |
| R106 | 1.5 ohm 2 W 1% | 103-3400 |
| R107 | 0.6 ohm 3 W 1% | 103-3399 |
| R108,109 | 1M 3 W 1% special high voltage type | 103-2223 |
| R110,111 | 750k 2 W mox 2% | 103-1743 |
| R112-119 | 50k 7 W 5% | 103-7580 |
| R120 | 51ohm 2 W mox 5% | 103-2151 |
| R122 | 6.8k 1/4 W | 103-1747 |
| R123 | 1.8k 1/4 W | 100-0728 |
| R124,125 | 50k trim pot | 104-0400 |
| R126,128,128 | 47k 1/2 W | 101-0402 |
| R127 | 10 ohm 10 W | 103-9702 |
| R130 | 47 ohm 1/2 watt | 101-1470 |
| RLY101 | 3PDT 12 Vdc | 408-6140 |
| RLY102 | SPST 12 Vdc | 408-6148 |
| RFC101 | Choke 3 turns FB-73 | 10-15168 |
| T101 | Toroid | 10-14134 |
| Q101 | 2N3904 | 305-0645 |
| Q102 | 2N3906 | 305-0722 |
| Q3 (see main chassis) | MJF3055 transistor, NPN | 305-3055 |
| F101 | 2 A | 755-1102 |

Tuned Input Board (50-0080-2)

| Designator | Description | Ameritron PN |
|-------------------------|-----------------|--------------|
| C201 (tube side) | See input chart | |
| C202 (transmitter side) | See input chart | |
| L201 | See input chart | |
| S201 | Input switch | |

AL-80B Tuned Input Chart

| BAND | C201 (pF) tube | L201 | C 201 (pF) transmitter side |
|-------|-----------------|-------------------|-----------------------------|
| 160 | 2700 (208-5689) | 28.75T (405-1287) | 2000 (208-5608) |
| 80 | 1300 (208-5177) | 23.75T (405-1237) | 1000 (208-5176) |
| 40 | 820 (208-5381) | 13.75T (405-1137) | 500 (208-5691) |
| 20/30 | 470 (208-5440) | 9.75T (405-1097) | 270 (208-5775) |
| 15/17 | 360 (208-5688) | 6.75T (405-1067) | 220 (208-5175) |
| 10/12 | 220 (208-5175) | 4.75T (405-1047) | 180 (208-5396) |

Meter Board (50-0080-3)

| Designator | Description | Ameritron PN |
|------------------------------|----------------------|--------------|
| D301 | 1N34A | 300-0346 |
| C301, 302 | .47 uF 50 V tantalum | 203-0530 |
| C303, 304, 307-311, 314, 315 | .1 uF 50 V | 200-0754 |
| C305, 306 | .001 uF 1 kV | 200-2120 |
| R301, 302 | 2.2M 1/4 W | 100-6220 |
| R303 | 390 ohm 1/4 W | 100-0390 |
| R304 | 2.2k 1/4 W | 100-1500 |
| R305 | 470k 1/4 W | 100-0188 |
| R306, 310 | 10k 1/4 W | 100-4100 |
| R307 | 100 ohm 1/4 W | 100-2100 |
| R308, 311 | 33k 1/4 W | 100-3330 |
| R309 | 4.7k 1/4 W | 100-1470 |
| R312 | 330 ohm 1/4 W | 100-0330 |
| R313 | 270 ohm 1/4 W | 100-0600 |
| IC301 | LM324 | 311-0324 |
| Q301, 302 | 2N3904 | 305-0645 |
| Q303 | 2N3906 | 305-0722 |
| S301 | Rotary 2P6T | 500-0563 |

AL-80B Instruction Manual**Timer / Overload Board (50-0080-5)**

| Designator | Description | Ameritron PN |
|------------|------------------------|--------------|
| C501-506 | .01 uF 50 V disc | 200-0416 |
| C507,508 | .47 uF tantalum | 203-0530 |
| C509 | 100 uF 25 V | 203-0564 |
| D501, 502 | 1N4001 | 300-0266 |
| D503 | 5.6 V zener | 301-710 |
| IC501 | LM 358 dual op-amp | 311-0724 |
| Q501 | NPN transistor MJF3055 | 305-3055 |
| Q502 | PNP transistor 2N3906 | 307-0722 |
| Q503, 504 | NPN transistor 2N3904 | 305-0645 |
| R501-503 | 10k 1/2 W | 101-0643 |
| R504, 505 | 3.3k 1/4 W | 100-0729 |
| R506, 508 | 680 ohm 1/4 W | 100-0532 |
| R507 | 1.8k 1/4 W | 100-0728 |
| R509 | 1 meg 1/4 W | 100-0730 |
| R510 | 1k 1/4 W | 100-0727 |
| R511 | 180 ohm 1/2 W | 101-0384 |
| RLY501 | DPDT 12 V dip relay | 408-2135 |
| FB | FB 73-801 Ferrite Bead | 10-15168 |

AL-80B Main Chassis Parts List

| Designation | Description | Ameritron PN |
|-------------|---|--------------|
| B1 | Blower | 410-3138 |
| C1-3 | .001 uF 7.5 kV | 200-7224 |
| C4 | 500 pF Doorknob 7.5 kV | 210-0470 |
| C5, 6 | 170 pF Doorknob 7.5 kV | 209-0559 |
| C7 | Air Variable Plate | 204-2112 |
| C8 | Air Variable Load | 204-2573-1 |
| D1 | LED, Red | 320-0522-1 |
| F1, 2 | See Jumper Connections Chart, (page Error! Bookmark not defined.) | ----- |
| 50-0080-1 | Power Supply / SWR Board Assembly | 50-0080-1 |
| 50-0080-2 | Input Circuit Board Assembly | 50-0080-2 |
| 50-0080-3 | Metering Board Assembly | 50-0080-3 |
| 50-0080-4 | RF Tank Board Assembly (only parts L1-L2) | 50-0080-4 |
| 50-0080-5 | Timer-Overload Board Assembly (optional.-See page 27) | 50-0080-5 |
| L1 | "L " Coil | 10-13165 |
| L2 | LF Coil (mounted on 50-0080-4) | 10-13240 |
| L3 | HF Coil (mounted on 50-0080-4) | 10-13108 |
| M1 | Meter (Forward and Reflected) | 400-3581 |
| M2 | Meter (grid and plate) | 400-3580 |
| R1 | 1 k pot (ALC limit) | 105-1301 |
| R2 | 100 k pot (ALC SET) | 105-1341 |
| RFC1 | Parasitic choke | 10-15105 |
| RFC2 | Plate Choke | 10-15197 |
| RFC3 | 2.5 mH Choke | 402-1162 |
| S1 | Band Switch | 500-2135 |
| S2 | Lighted Switch | 507-1157 |
| S3 | Rocker Switch | 507-1150 |
| S4 | Interlock Switch | 504-3247 |
| R3 | 33 ohm 1/4 watt | 100-1330 |
| Q3 | Transistor MJF-3055 | 305-3055 |
| T1 | Transformer | 406-1109-2C |
| V1 | 3-500Z Tube | 350-0167 |

Frequency Coverage

| AL-80B | | AL-80BX | |
|------------|----------------|------------|----------------|
| 160 meters | 1.8-2.0 MHz | 160 meters | 1.8-2.0 MHz |
| 80 meters | 3.3-4.4 MHz | 80 meters | 3.3-4.4 MHz |
| 40 meters | 6.3-8.3 MHz | 40 meters | 6.3-8.3 MHz |
| 20 meters | 10.1-15.5 MHz | 20 meters | 10.1-15.5 MHz |
| 15 meters | 16.5-21.5 MHz* | 15 meters | 16.5-21.5 MHz* |
| | | 10 meters | 24-29 MHz* |

* Operation on 11-13 MHz, 15.5-16.5 MHz, and 25-27.9 MHz will damage components.

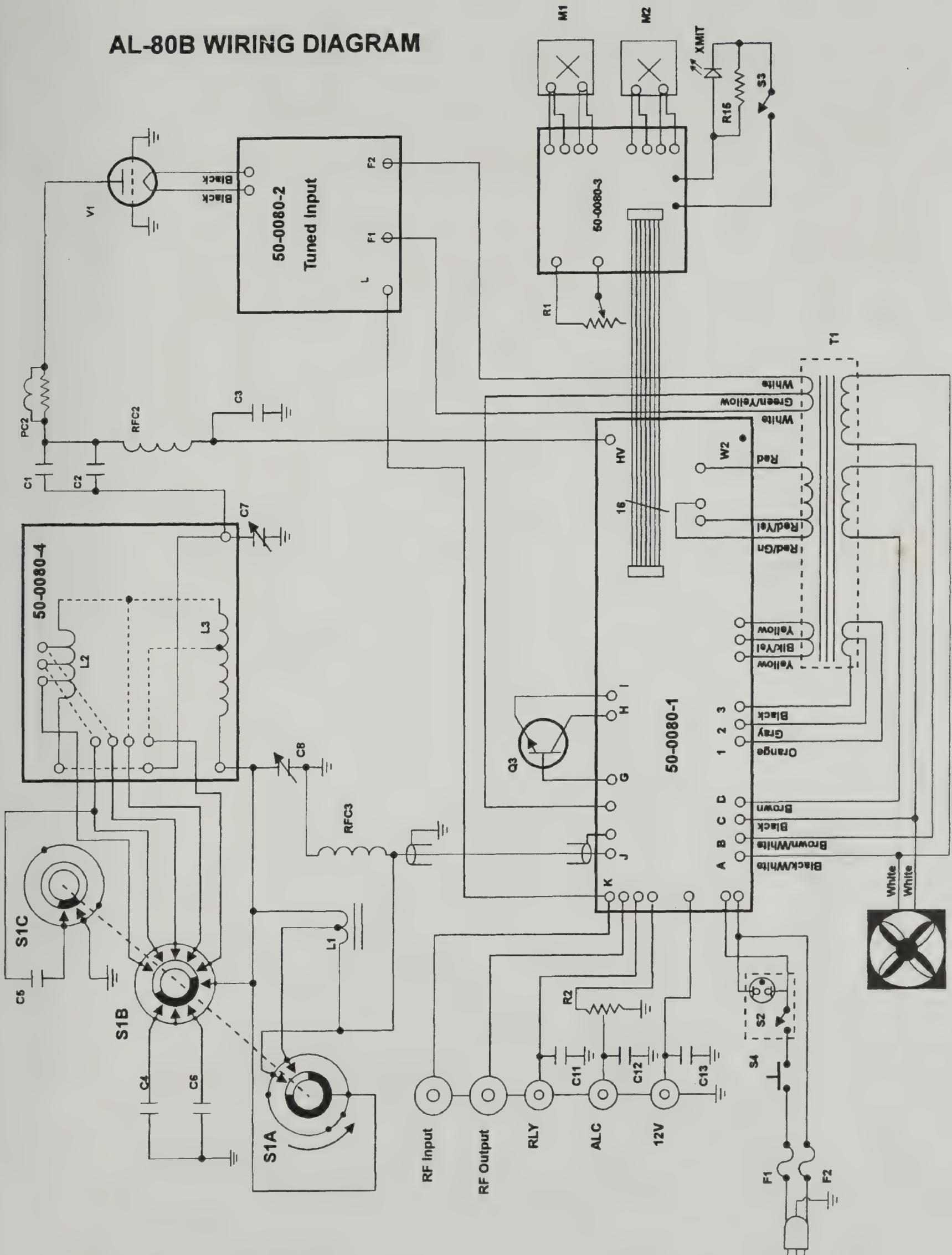
Amplifier Tuning Log

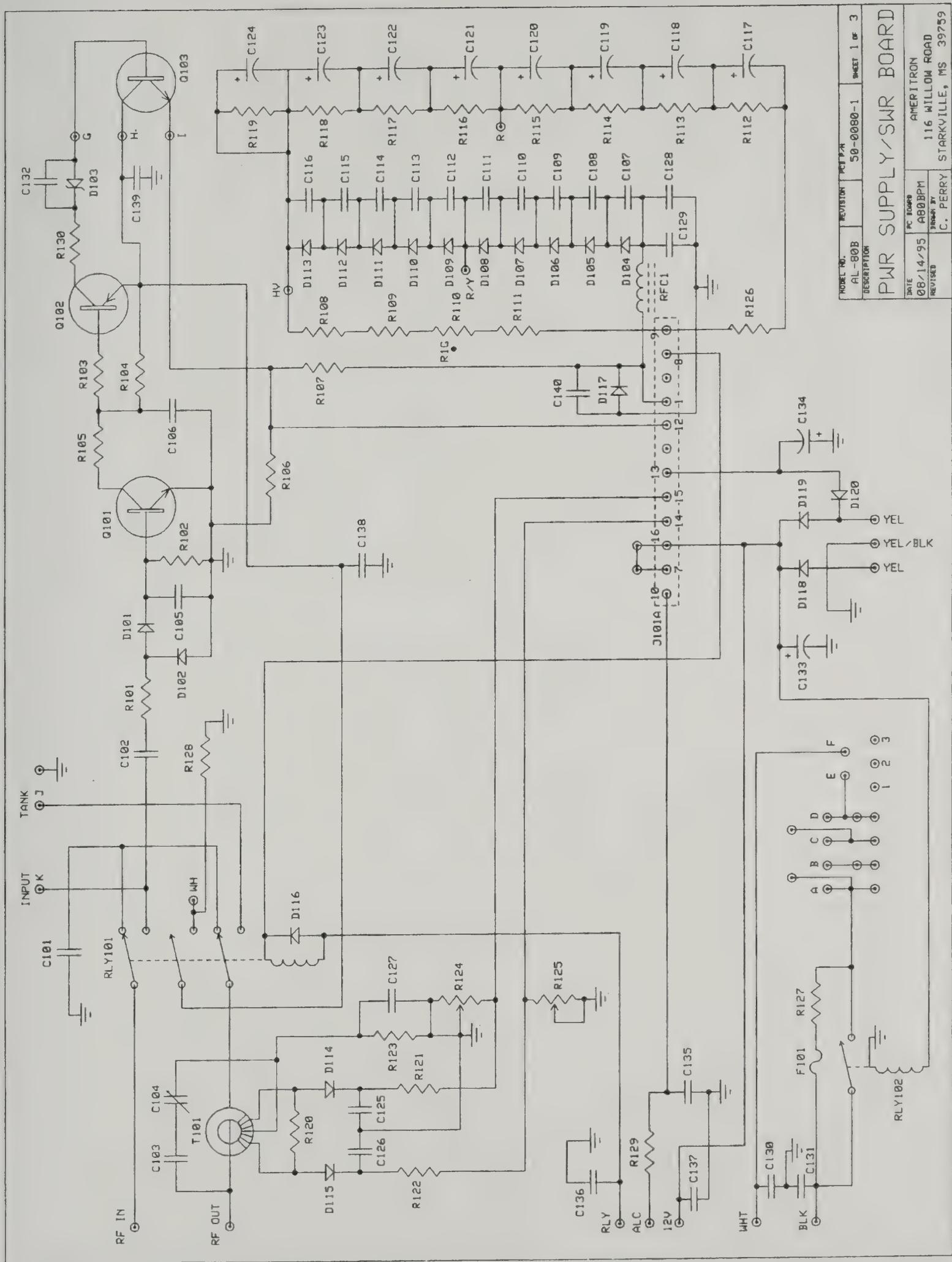
| Band | "LOAD" | "PLATE" |
|---------|--------|---------|
| 160 CW | | |
| 160 SSB | | |
| 80 CW | | |
| 75 SSB | | |
| 40 CW | | |
| 40 SSB | | |
| 30 CW | | |
| 20 CW | | |
| 20 SSB | | |
| 17 CW | | |
| 17 SSB | | |
| 15 CW | | |
| 15 SSB | | |

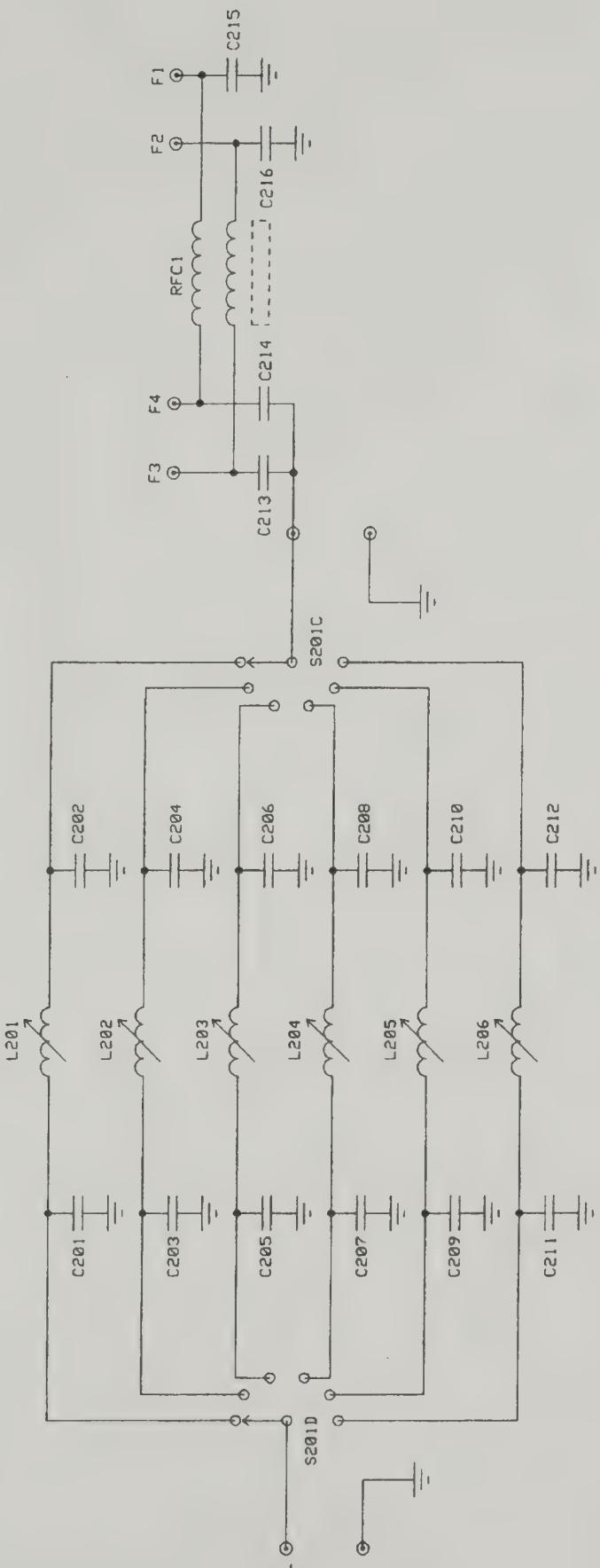
Fill in this log with the amplifier settings to quickly change bands. Use a pencil as settings may change with different antennas.

Notes:

AL-80B WIRING DIAGRAM



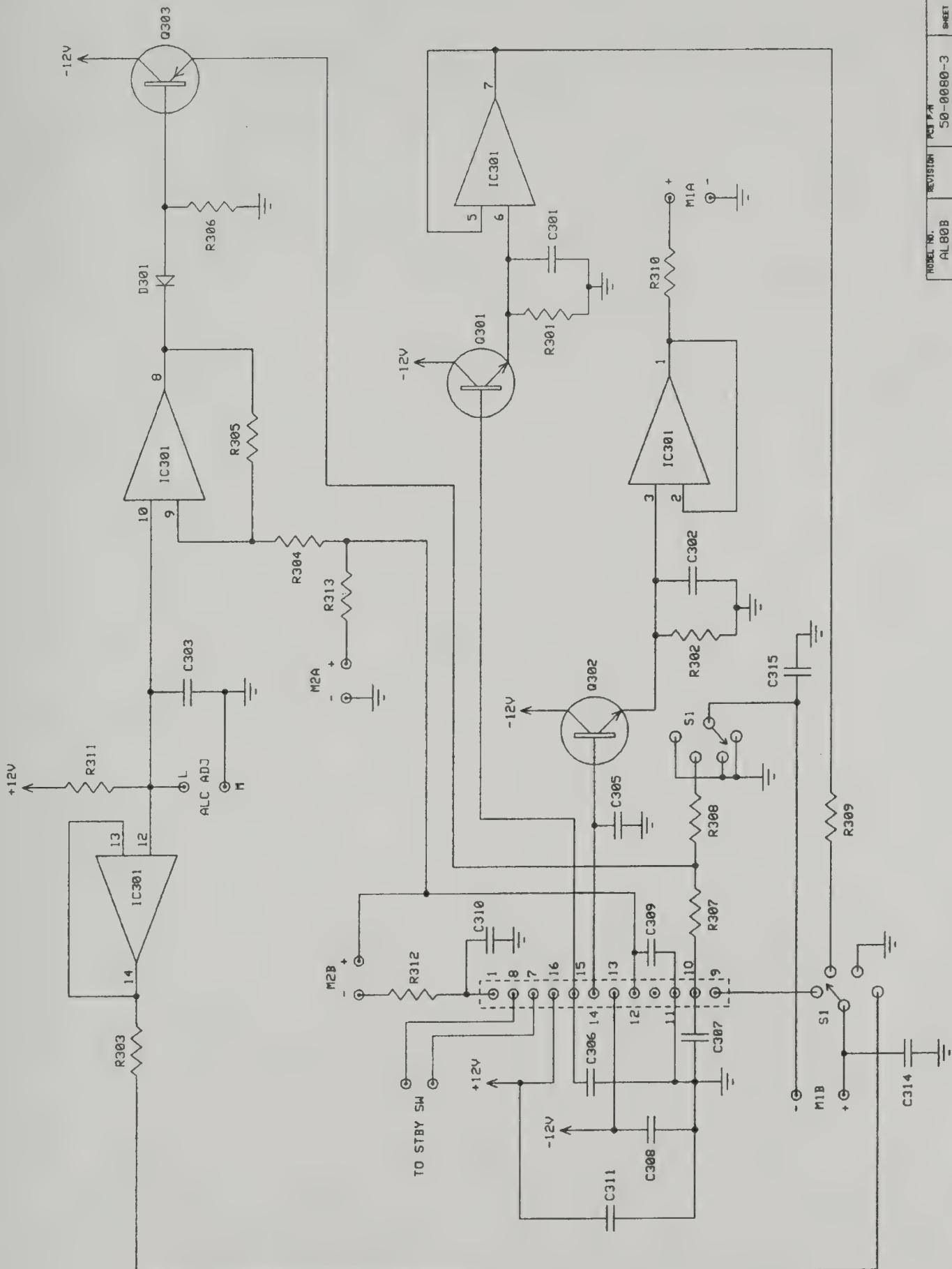




| MODEL NO. | REVISION | PCB P/N | 50-0080-2 | SHEET 2 OF 3 |
|-----------|----------|---------|-----------|--------------|
| QL-80B | | | | DESCRIPTION |

INPUT BOARD

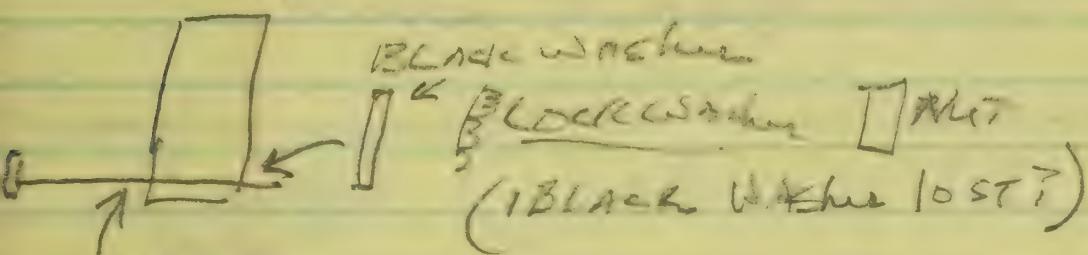
| | | |
|------------------|---------------------------------------|--|
| DATE 08/14/95 | PC BOARD REVISED BY C. PERRY | AMERITRON 116 WILLOW ROAD STARKVILLE, MS 39759 |
|------------------|---------------------------------------|--|



| MODEL NO. | REVISION | PN | REV | SHEET |
|---------------|-------------|-----------------|--------|-----------|
| AL 80B | PC 30001 | 50-0080-3 | 3 of 3 | |
| DESCRIPTION | | | | |
| DATE 08-14-95 | PC 30001 | 116 WILLOW ROAD | | AMERITRON |
| REVISED | BY C. PERRY | STARKVILLE, MS | 39759 | |

METER BOARD

~~① Replaced Black lead
in bottom of stage w/
existing green lead.~~



① BLACK WASHER

FLAT WASHER STEEL

② Unsolder left side to frame

③ Other side of Board TAKE OUT
POT

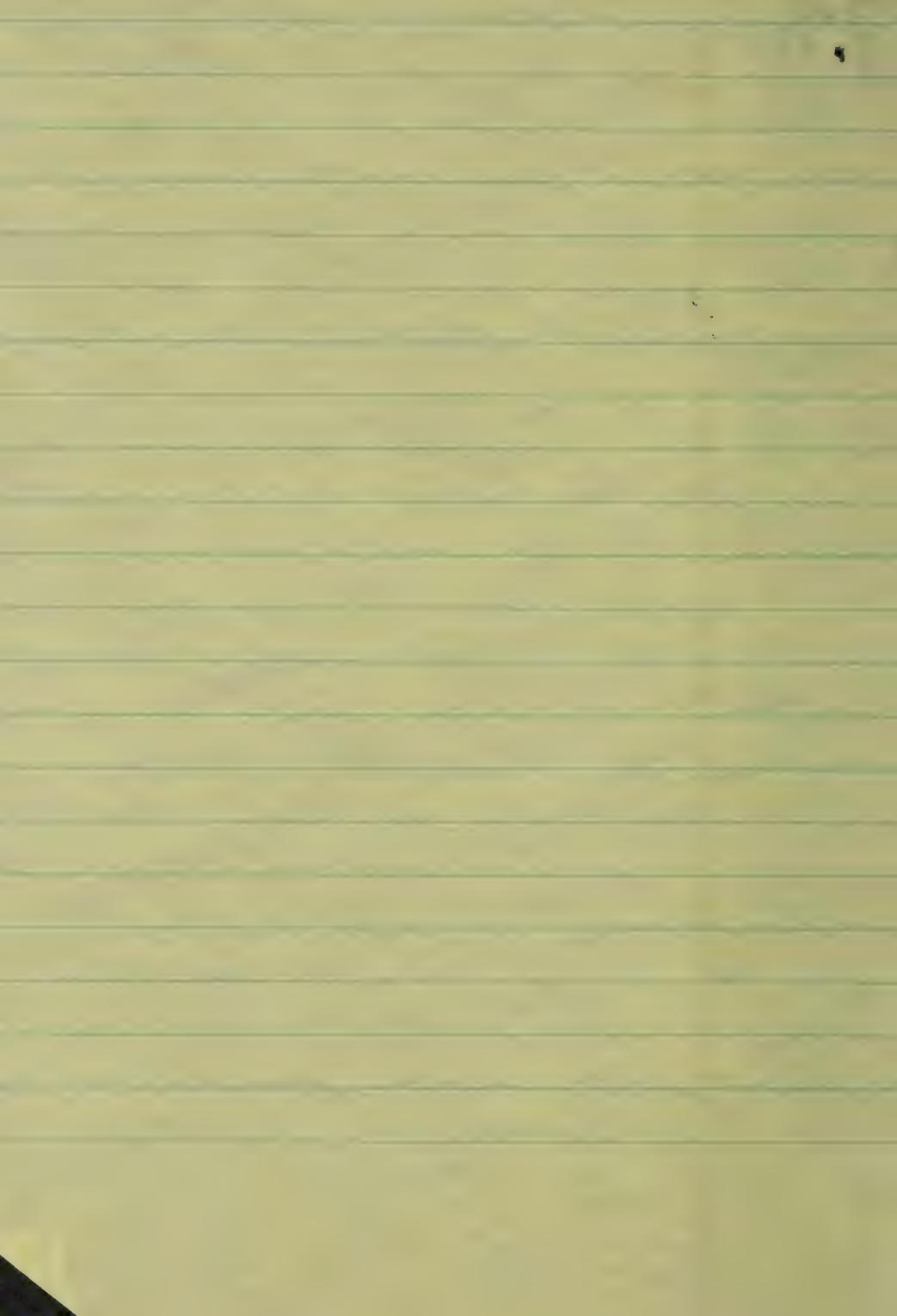
a. Unsolder short wire wire to POT

b. Unsolder long wire from other side of POT to 3300Ω
resistor

c. unsolder green resistor to PTC

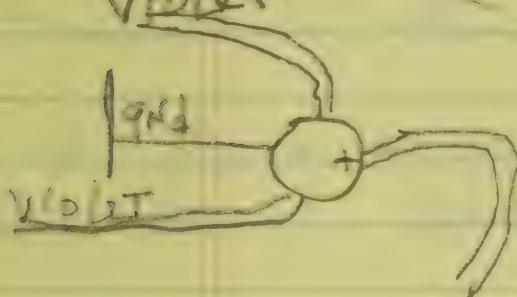
d. Unsolder Relay Output
(has finite lead) P
point with little
green cap

e. unsolder Top + bottom
wires from relay to top
& bottom in-out



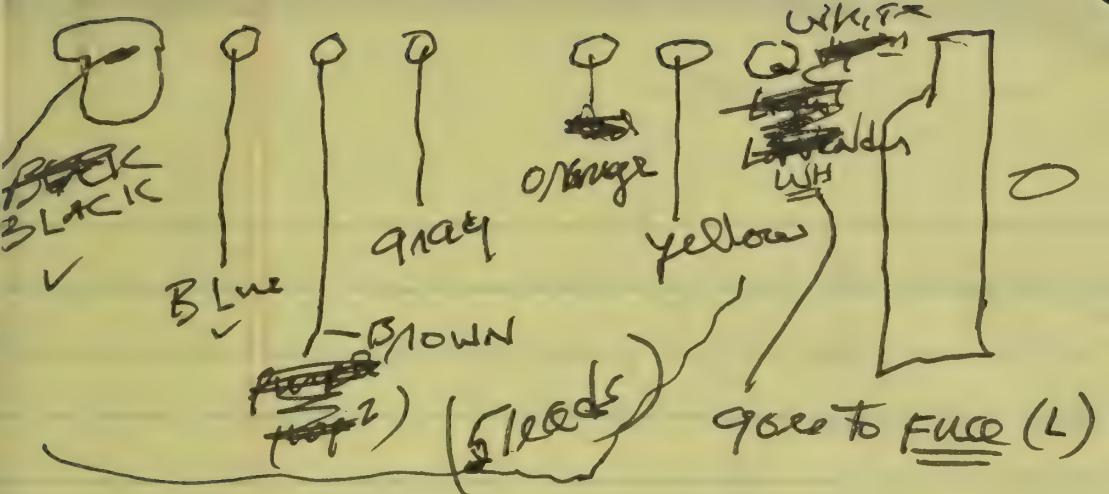
CAP;
-MINUS TO TOP (cna)

Bridge (look at Bd)



$$V_{10} = 8.5 \text{ VR}$$



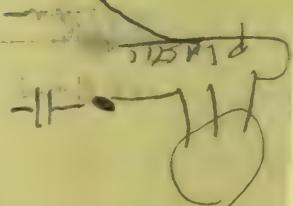
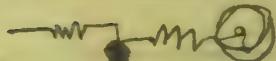


HV old = Striped white (Red) (2)
 " New = Red (2) ??

New has 2 greens
 " " 1 yellow
 " " 2 purple (small
 " " 1 Blue
 " " 1 orange
 " " 1 BLACK
 " " 1 BROWN
 (other concentrations)
 Old 2 greens going to board
 New has 2 greens

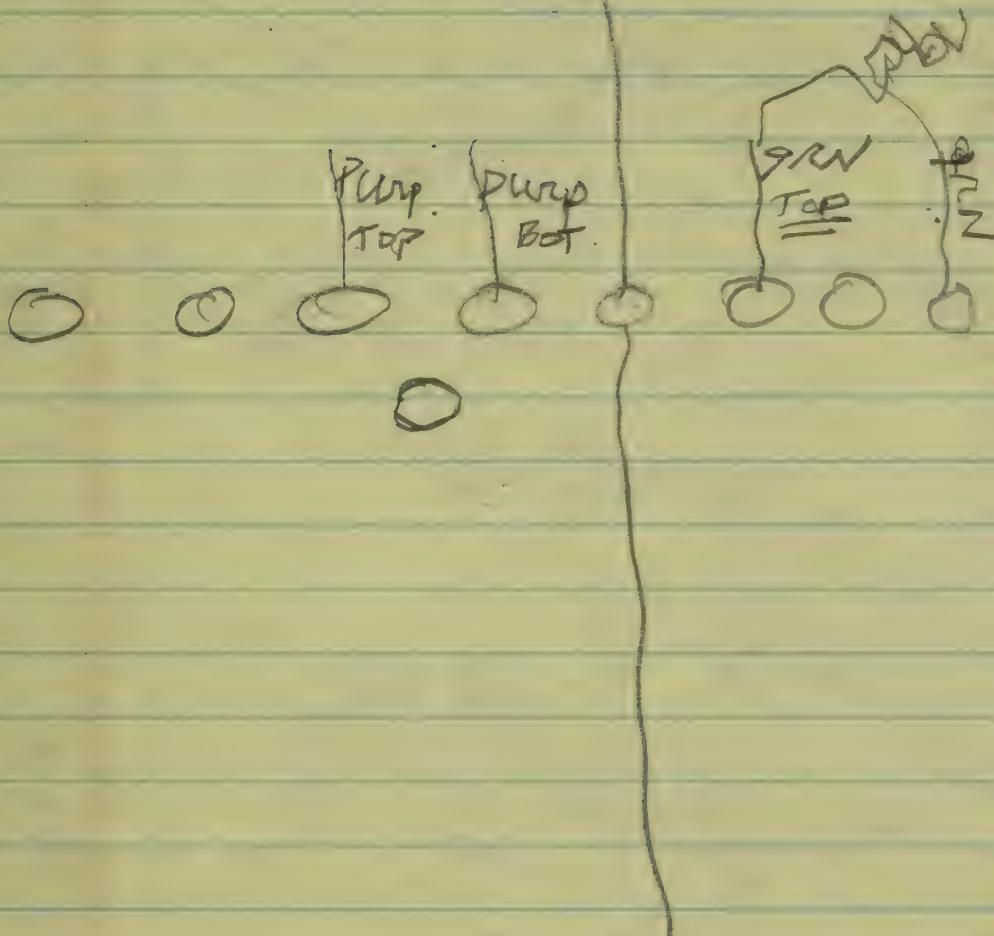
old ✓
 (2 To board ✓
 BLACK ✓
 ✓ ✓
 ✓ ✓
 ✓ ✓
 ✓ ✓
 ✓ ✓

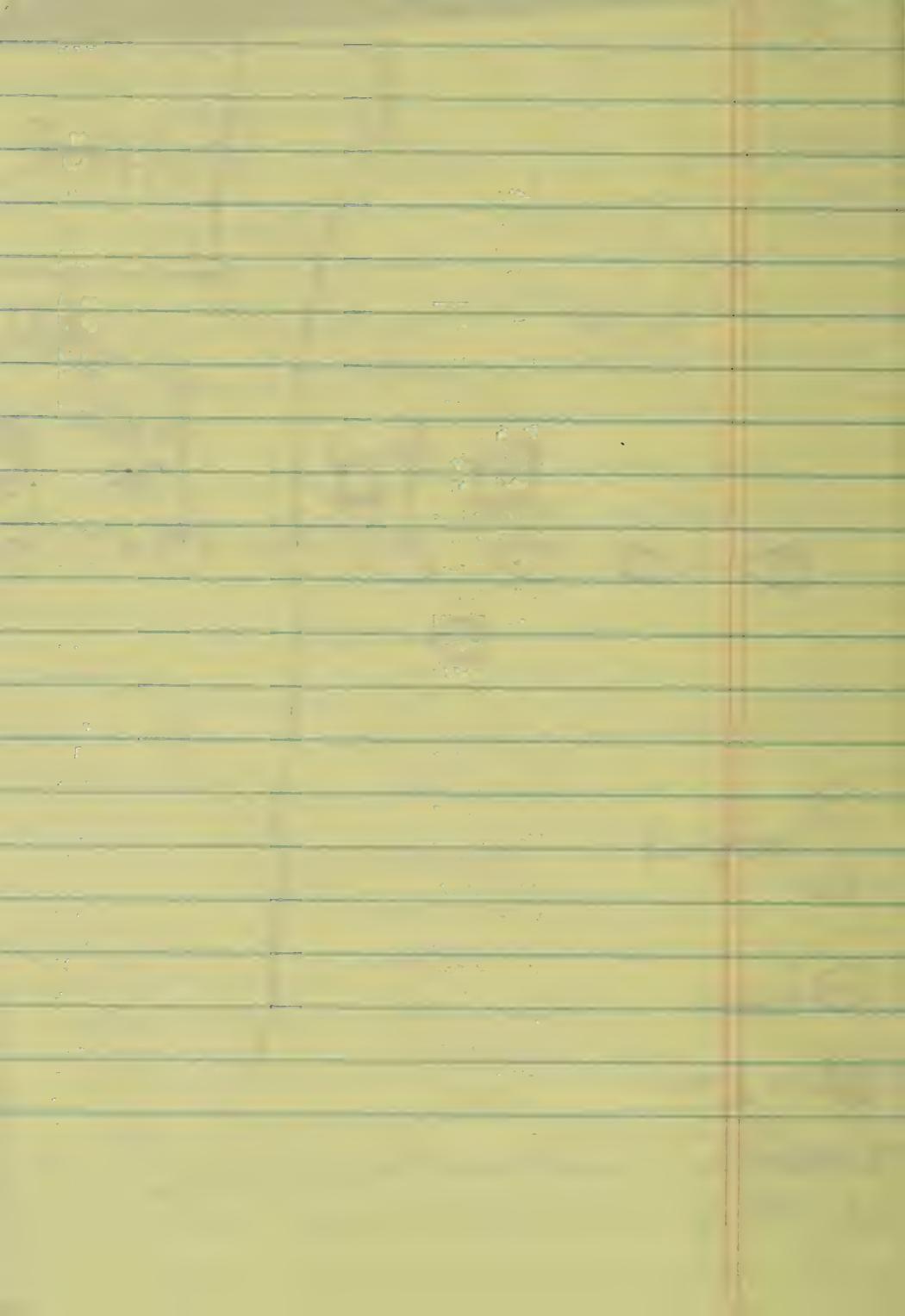
harm ^c
_a



WHITE

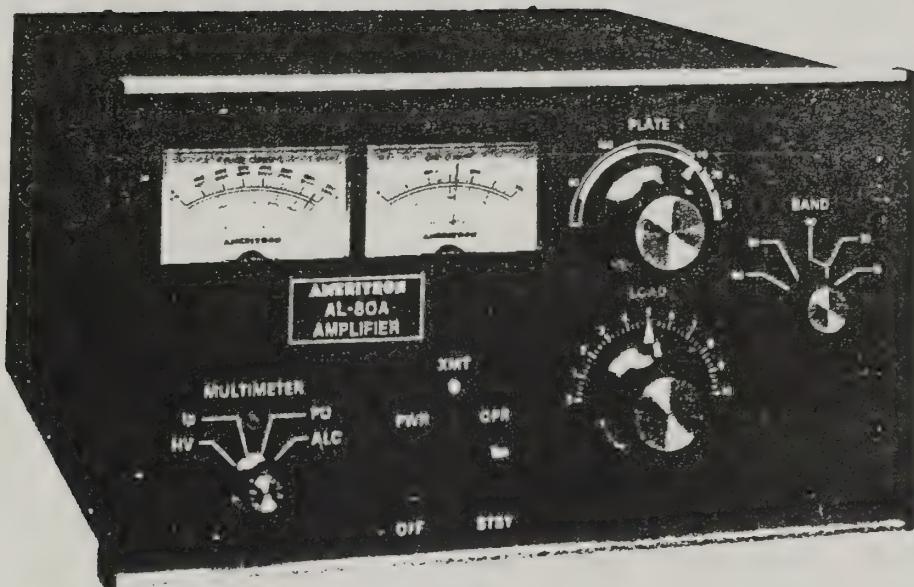
XFMR





AMERITRON AL-80A

HIGH POWER LINEAR AMPLIFIER INSTRUCTION MANUAL



The Ameritron AL-80A Linear Amplifier is designed for 1000 Watts output SSB PEP (850 Watts output on CW) with high efficiency and total reliability. The AL-80A covers the amateur radio bands 160 through 15 meters. It also features wide frequency coverage for MARS and other services authorized to operate at high power.

The AL-80A uses an Eimac 3-500Z high-mu triode in a class AB₂ ground-grid circuit.

A built-in ALC circuit prevents the amplifier output from flat-topping if the exciter gain is inadvertently set too high.

The AL-80A is factory wired for 117V, 50/60 Hz primary line voltage.

AMERITRON
DIVISION OF
PRIME INSTRUMENTS, INC.
9805 Walford Avenue • Cleveland, Ohio 44102

VENTILATION

The AL-80A ventilation system has been designed and tested to maintain tube seal temperatures safely below the tube manufacturer's rating when operated within our guidelines.

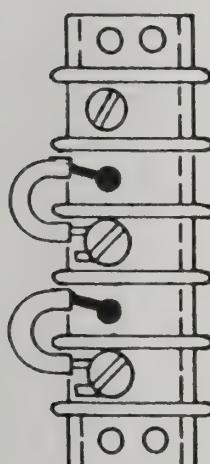
To insure proper ventilation in your installation, observe the following:

1. Do not block or restrict the ventilation holes in the cover.
2. The exhaust air flow is over 50 CFM. Do not "assist" the air flow unless the fan used exceeds the AL-80A blower CFM by a factor of 2:1.
3. Do not mount additional fans on the AL-80A cabinet.
4. The exhaust air will become quite warm at high power levels. Do not place any heat sensitive objects in the exhaust air stream.

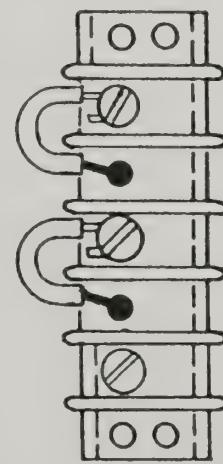
POWER CONNECTIONS

The AL-80A is supplied with a NEMA 5-15P plug for 117 VAC operation. The AL-80A can be modified for 234 VAC operation. If you desire to make this modification, two jumper wires must be moved to new locations on the terminal block. (see illustration below) The terminal block is located on the left side of the rear panel.

The wiring between the fuse box and the amplifier A.C. outlet must be No. 12 gauge or larger in order to supply the current required (15 amperes) without a significant drop in line voltage. The outlet should be fused for 20 amperes.



117 VOLT OPERATION



234 VOLT OPERATION

ALC

Use a shielded audio-type cable to connect the 0-20 volt negative ALC voltage to the transmitter ALC input. Consult the transmitter manual for proper connection details. The amplifier must be properly tuned on CW before adjusting the ALC.

Proper adjustment is achieved as follows:

1. Set the MULTIMETER switch to the PO position.
2. Set the transmitter audio control about 20% higher than normal.
3. Speak into the microphone in a normal tone of voice and observe the reading on the 0-2000 R.F. Watts scale.
4. Adjust the ALC ADJ control on the rear panel until the amplifier is not clipping on an RF scope.
5. If an RF scope is not available, adjust the ALC control so the audio peaks do not exceed the single tone output of 1000 watts.

METERING FUNCTIONS

The AL-80A has two illuminated panel meters. The Grid Current meter provides a continuous reading of grid current. This is an exclusive feature of Ameritron amplifiers. Grid current will indicate proper operation of the amplifier better than any other parameter. Do not exceed 200 mA on this meter during operation of the amplifier. The other meter reads Plate Voltage (HV), Plate Current (Ip), Peak R.F. Watts (PO) and ALC. The functions are explained as follows:

PLATE VOLTAGE (HV): Read D.C. Plate Voltage on the 0-3500 Volt scale. This scale is 100 volts per division. Normal voltages are 3100 volts no load, 2700 volts full load.

PLATE CURRENT (Ip): Read Plate Current on the 0-700 mA scale. This scale is 20 mA per division. The average operating current rating of the 3-500Z is 400 mA maximum.

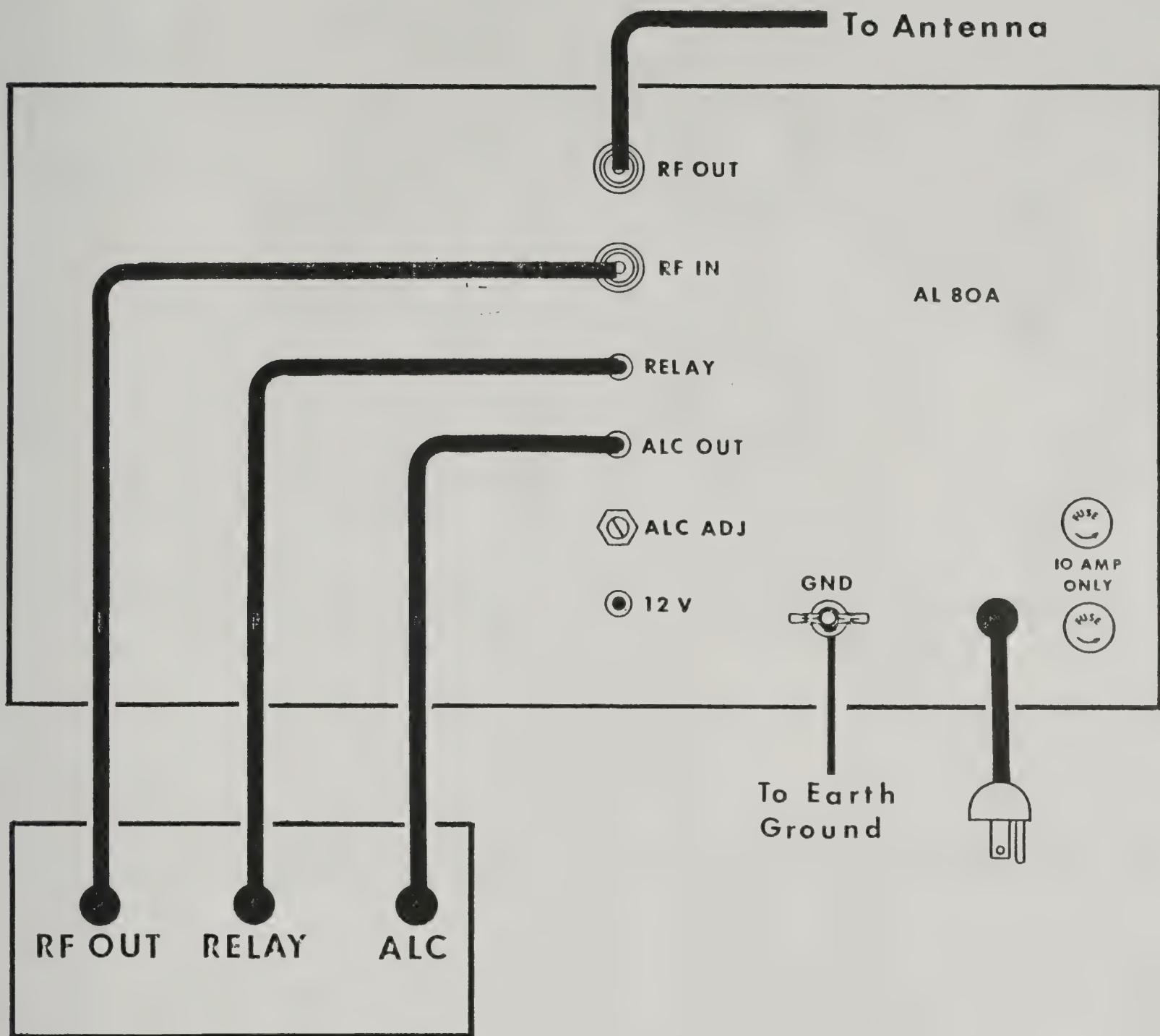
PEAK R.F. WATTS (PO): Read Peak R.F. Watts on the 0-2000 scale. The scale has 50 watt divisions below 1000 watts and 100 watt divisions above 1000 watts.

ALC: In this position the meter indicates the ALC detector voltage. It provides a relative drive level indication of 200 watts full scale. The approximate drive level (average, not PEP) can be estimated by dividing the Peak R.F. Watts scale by 10.

IMPORTANT

Do not make any modifications to the AL-80A circuit before checking with our engineering staff. Improper changes may damage the AL-80A and void the warranty.

Connection Diagram

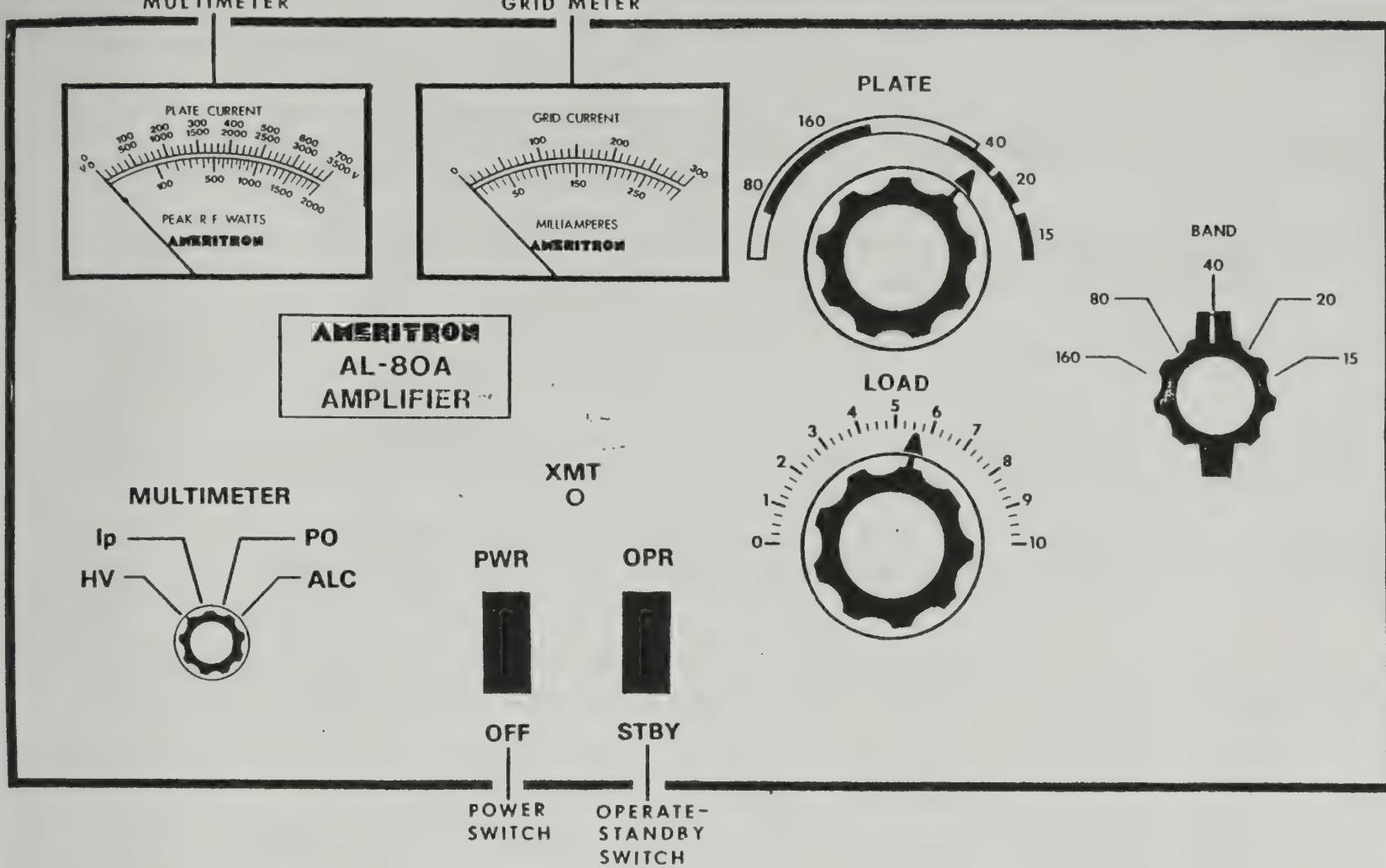


Transmitter or Transceiver

INSTALLATION

Connect the RF output of the transmitter to the RF IN connector on the rear of the AL-80A with 50 ohm coax. Connect the existing station antenna system to the RF OUT connector on the AL-80A with RG-8 type coax. Connect the RELAY phono jack on the rear of the AL-80A to the normally open terminals of the RELAY jack on the transmitter. The RELAY jack on the AL-80A has positive 12 VDC open circuit and provides 100 MA of current when pulled to ground. Connect as short a ground lead as possible from a good earth ground to the GND terminal.

The 12V connection on the rear panel provides 12 VDC at 100 MA maximum to operate external dial lamps or accessories.



TUNING INSTRUCTIONS

Follow the instructions in numerical order. If the various meter readings are different than indicated in the instructions, check the connections from the exciter to the amplifier and make sure they are correct. Consult the manual for the exciter if necessary.

1. Set the AL-80A front panel switches as follows:
 PWR - OFF to OFF
 OPR - STBY to STBY
 MULTIMETER to HV
2. Plug the A.C. line cord into the proper voltage outlet. The AL-80A is factory wired for 117VAC 50/60 Hz operation.
3. Set the PWR-OFF switch to PWR. The meter lamps should light and the blower should start. Read the 0-3500V scale on the multimeter. It should indicate 3100 volts nominal.
4. With the amplifier still on standby, tune the exciter into the normal 50 ohm load according to the manufacturer's instructions. Turn the exciter drive fully down after tuning.
5. Place the bandswitch on the same band as the exciter, the PLATE tuning control in the dial range for the band selected and the LOAD control at the recommended point for the band in use.
6. With the exciter drive still at zero, place the MULTIMETER switch in the Ip position. Observe the 0-700 mA scale. It should read zero. Place the STBY-OPR switch in the OPR position.

7. Key the exciter (no drive) and observe the plate current on the 0-700 mA scale. Plate current should now read slightly over 100 mA.
8. Apply only enough drive to indicate a grid current of 50 mA or an I_p of no more than 200 mA. Tune the PLATE control for maximum grid current. It is normal for the plate current to dip at this point. If the grid current goes over 100 mA reduce the drive at once. Unkey the exciter.
9. Place the MULTIMETER switch in the PO position and observe the 0-2000 peak R.F. watts scale. Apply the same drive again and adjust the LOAD and PLATE controls for maximum output on the 0-2000 scale.
10. Increase the drive until 125mA of grid current is indicated. Adjust the LOAD and PLATE controls again for maximum output. The grid current will be lower now.
11. Advance the drive to 200 mA of grid current. Adjust the LOAD and PLATE controls for maximum output power. (Repeat this step twice.) The output should be around 1000 watts now with 100 watts of exciter power.
12. Apply enough drive to indicate either 1000 watts of output power or 200 mA of grid current. Re-peak the LOAD and PLATE controls. The grid current must not be over 200 mA, the plate current over 550mA or the output over 1200 watts.
13. In CW operation the drive power should be reduced until the plate current is 400 mA or less. For SSB operation the modulation crest should not exceed 400 mA plate current, 100 mA grid current or 1200 watts PEP output.

TUNING CHART (Typical)

| FREQUENCY | BANDSWITCH | PLATE CONTROL | LOAD CONTROL |
|-----------|------------|---------------|--------------|
| 1.85 | 160 | 160 | 4 |
| 3.5 | 80 | 80 | 1½ |
| 3.8 | 80 | 80 | 3½ |
| 7.2 | 40 | 40 | 5 |
| 14.2 | 20 | 20 | 5½ |
| 21.2 | 15 | 15 | 7½ |
| *24.5 | 10 | 20 | 7 |
| *28.7 | 10 | 15 | 8 |

* AL-80AX (export model)

The AL-80A will operate with full output on all WARC bands except 24.5 MHz. The AL-80AX (export model) will operate with full output on all WARC bands.

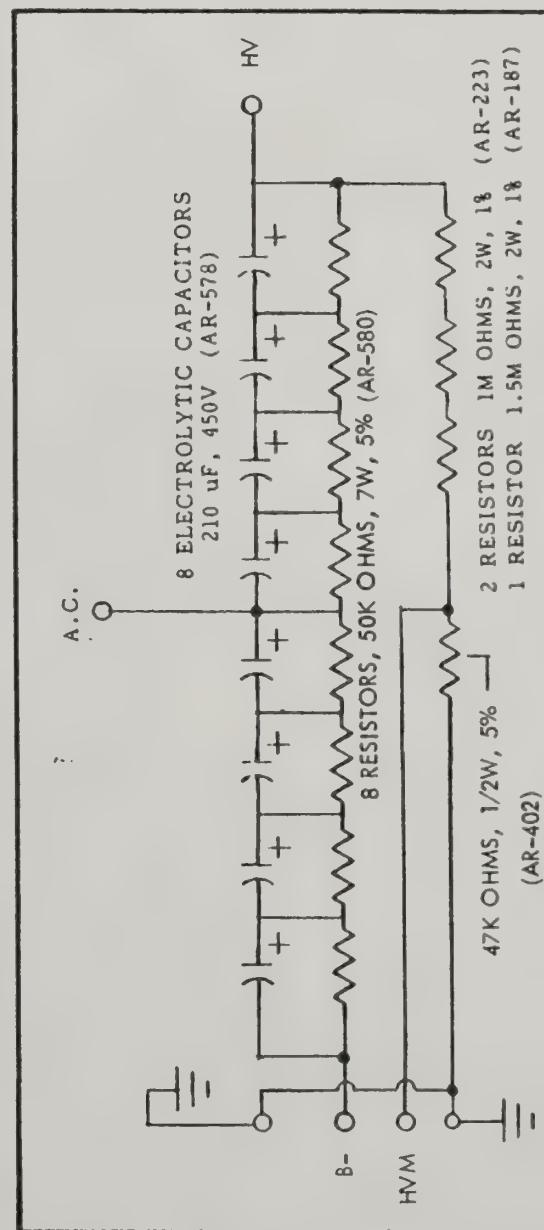
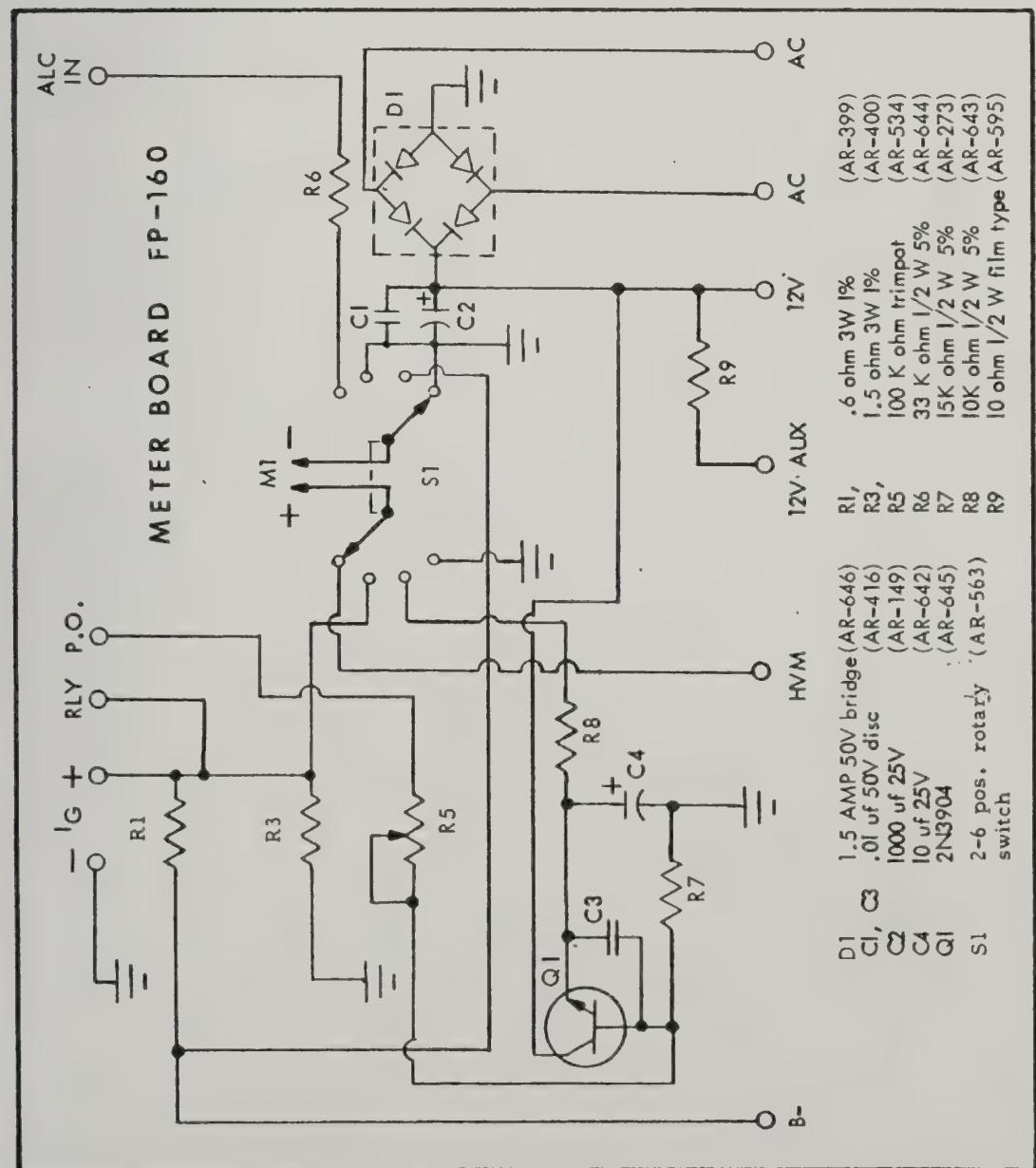
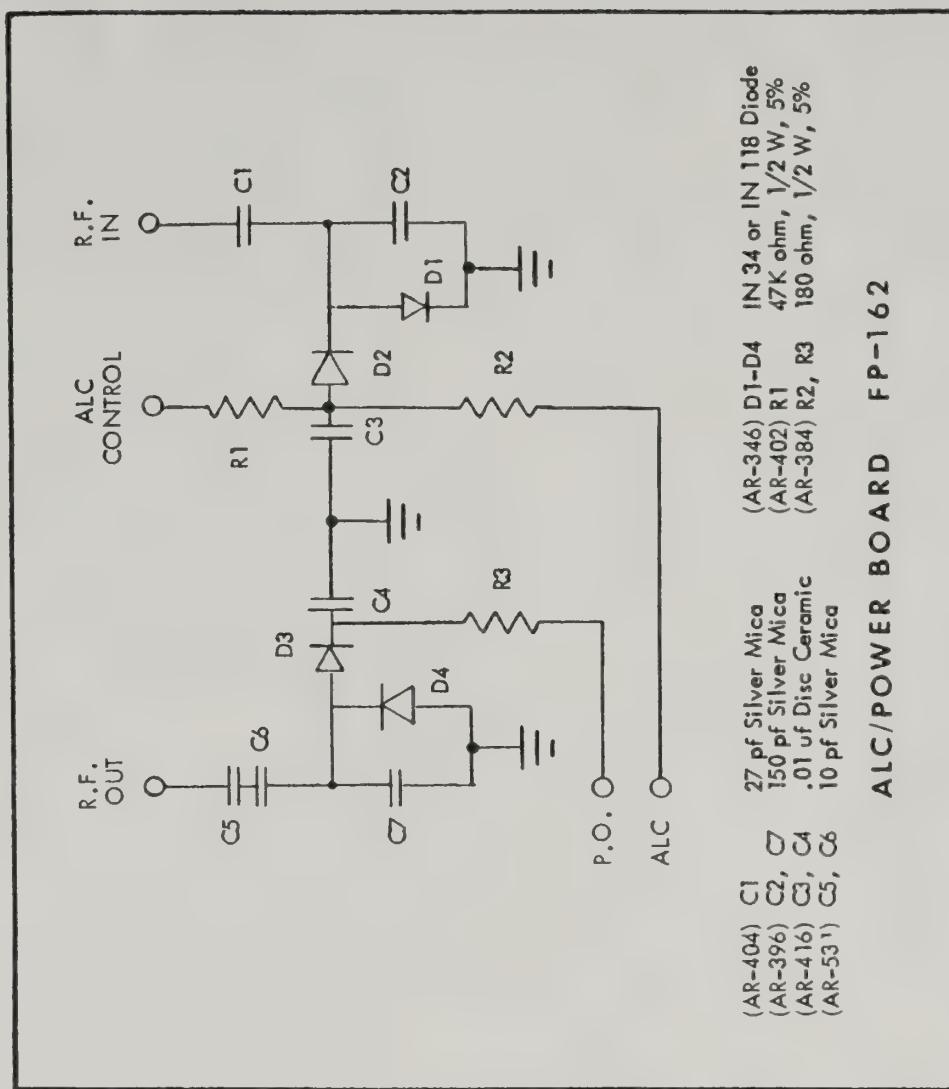
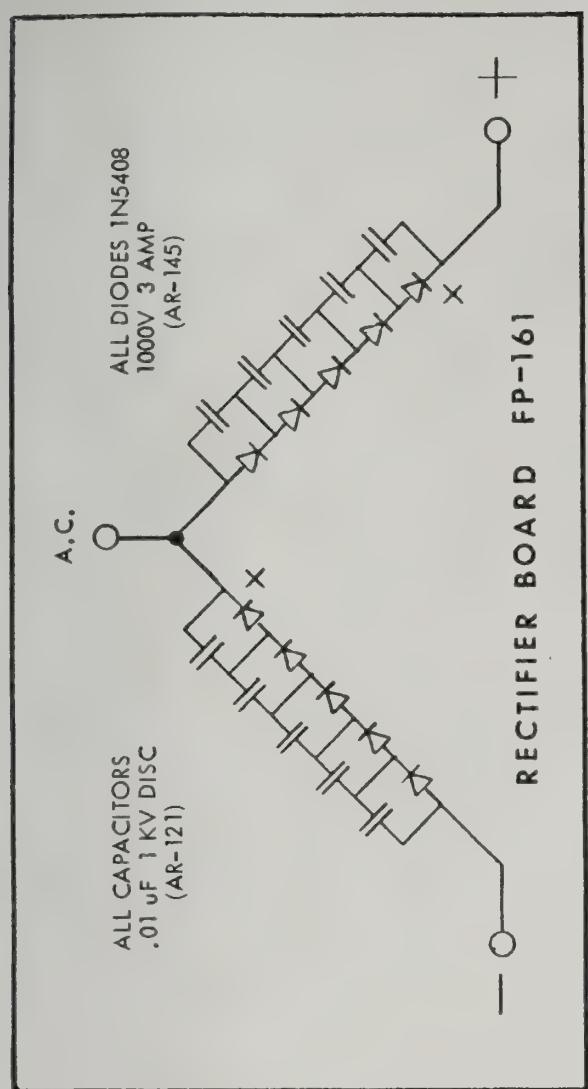
STANDARD FREQUENCY COVERAGE

AL-80A

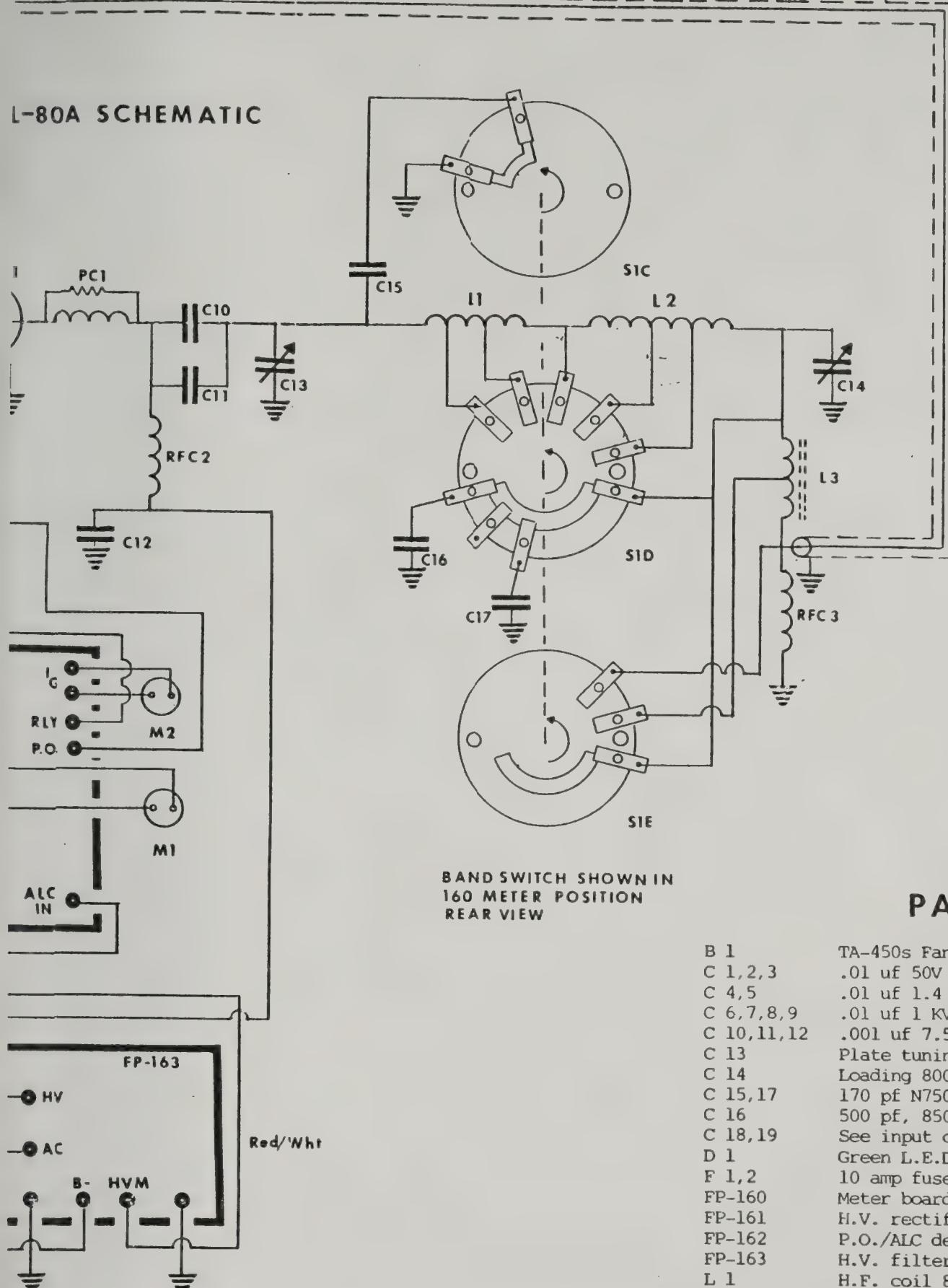
| | |
|------------|---------------|
| 160 meters | 1.8-2.0 MHz |
| 80 meters | 3.3-4.4 MHz |
| 40 meters | 6.3-8.3 MHz |
| 20 meters | 9.5-15.5 MHz |
| 15 meters | 15.5-21.5 MHz |

AL-80AX

| | |
|------------|---------------|
| 160 meters | 1.8-2.0 MHz |
| 80 meters | 3.3-4.4 MHz |
| 40 meters | 6.3-8.3 MHz |
| 20 meters | 9.5-15.5 MHz |
| 15 meters | 15.5-21.5 MHz |
| 10 meters | 24-29 MHz |



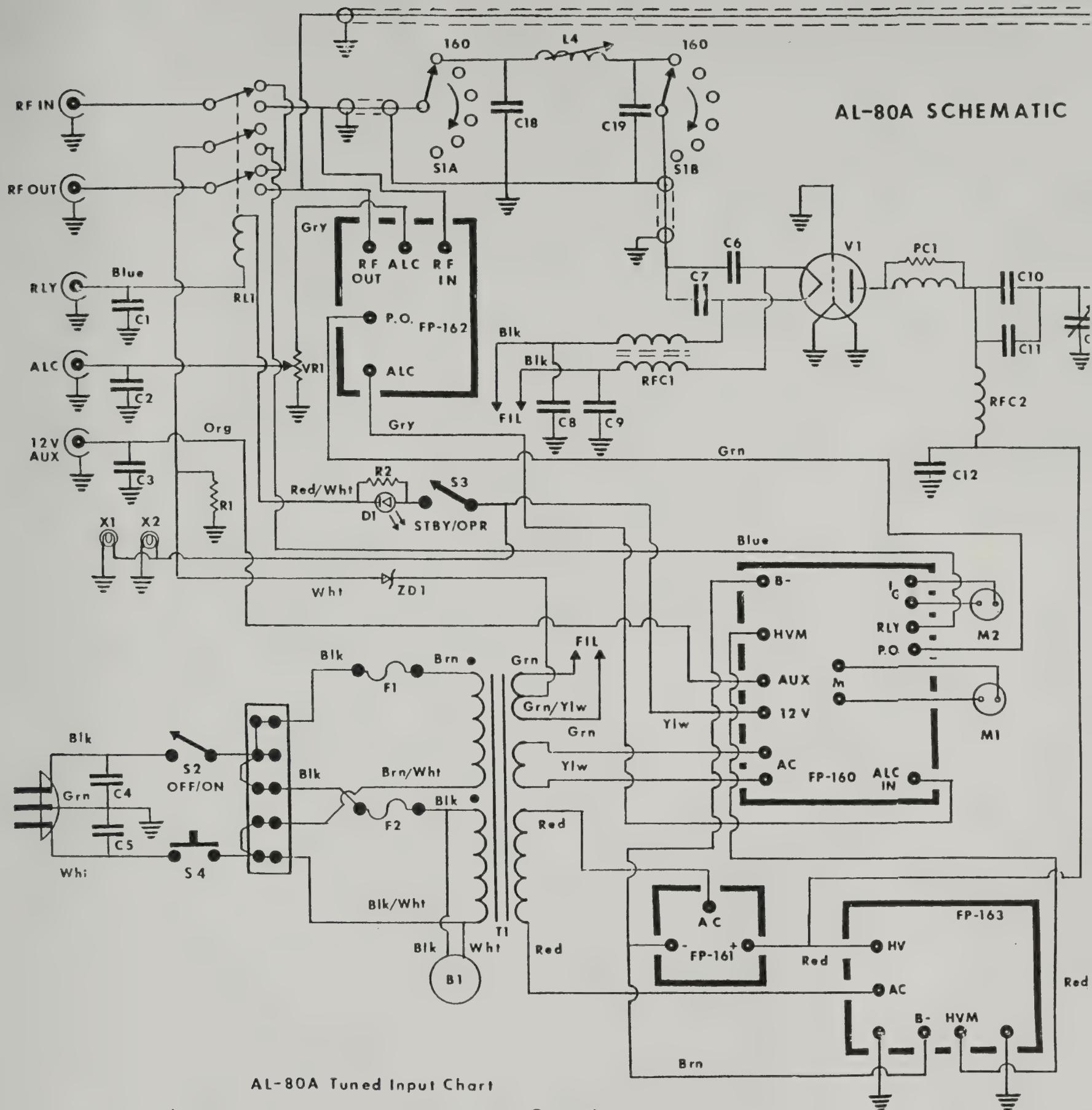
L-80A SCHEMATIC



BAND SWITCH SHOWN IN
160 METER POSITION
REAR VIEW

PARTS LIST

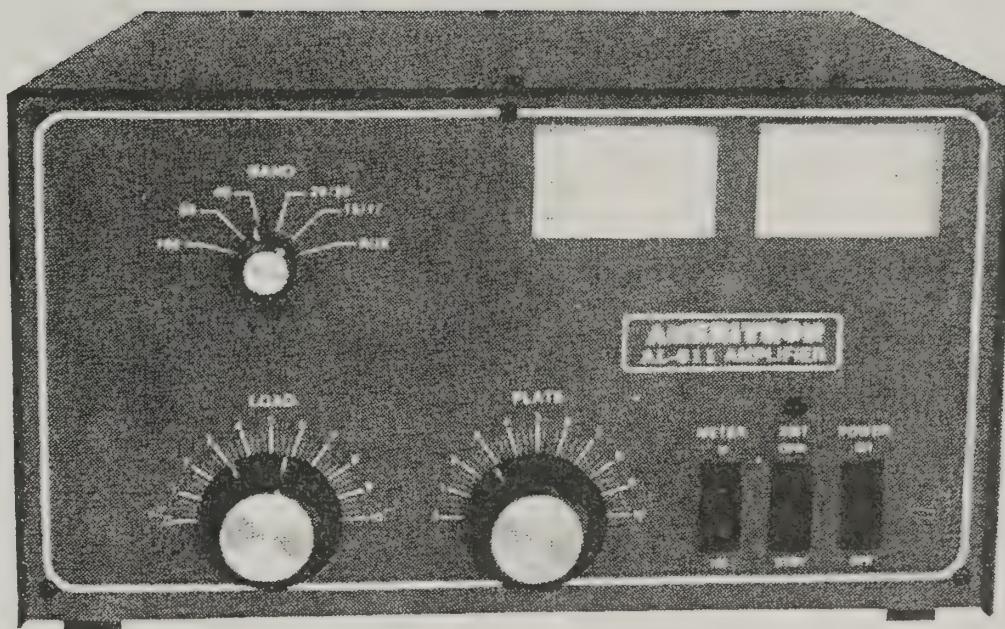
| | |
|------------|---|
| B 1 | TA-450s Fan #A30390-10 (AR-138) |
| C 1,2,3 | .01 uf 50V disc (AR-416) |
| C 4,5 | .01 uf 1.4 KV disc (AR-122) |
| C 6,7,8,9 | .01 uf 1 KV disc (AR-121) |
| C 10,11,12 | .001 uf 7.5 KV disc (AR-224) |
| C 13 | Plate tuning 250 pf .075" spacing variable (AR-112) |
| C 14 | Loading 800 pf 1.2 KV variable (AR-573) |
| C 15,17 | 170 pf N750, 850 series doorknob (AR-559) |
| C 16 | 500 pf, 850 series doorknob (AR-412) |
| C 18,19 | See input chart |
| D 1 | Green L.E.D. (AR-523) |
| F 1,2 | 10 amp fuse 3AG (AR-150) |
| FP-160 | Meter board assembly |
| FP-161 | H.V. rectifier board assembly |
| FP-162 | P.O./ALC detector board assembly |
| FP-163 | H.V. filter capacitor board assembly |
| L 1 | H.F. coil 8 ga. tin plated (FP-164) |
| L 2 | L.F. coil 2" I.D. #12 airdux (AR-669) |
| L 3 | "L" coil T 200-2 toroidal core (FP-165) |
| L 4 | See input chart |
| M 1 | Multimeter, 0-1 mA 420 ohm (AR-692) |
| M 2 | Grid meter, 0-1 mA 450 ohm (AR-693) |
| PC 1 | Parasitic choke and plate cap assembly (FP-117) |
| R 1 | 47K ohm, $\frac{1}{2}$ watt carbon (AR-402) |
| R 2 | 33 ohm, $\frac{1}{2}$ watt carbon (AR-403) |
| RFC 1 | Filament choke (FP-115) |
| RFC 2 | Plate Choke (FP-139) |
| RFC 3 | Safety choke (AR-162) |
| RL 1 | 3 PDT 10A relay, 12 VDC (AR-139) |
| S 1 | Bandswitch (AR-136-2) |
| S 2,3 | Rocker switch (AR-147) |
| S 4 | Interlock switch (AR-247) |
| T 1 | Power transformer (AR-109-2) |
| V 1 | 3-500Z tube (AR-167) |
| VR 1 | 100K ohm, $\frac{1}{2}$ watt ALC control (AR-274) |
| X 1,2 | 12V wire lead meter lamps (AR-164) |
| ZD 1 | 7.5V 10 watt anode to case (AR-604) |



*Export models only

AMERITRON AL-811

HF POWER LINEAR AMPLIFIER INSTRUCTION MANUAL



The Ameritron AL-811 is an economical 600 watt output linear amplifier that operates reliably from 160 through 15 meters. The AL-811 uses three 811A tubes in a class AB2 grounded grid circuit. Heavy duty power supply and RF components provide a long service life for components. The AL-811 is shipped factory wired for 120 volt, 50/60 Hz power mains. The AL-811X export model is shipped factory wired for 240 volt, 50/60 Hz power mains.

AMERITRON
116 Willow Road
Starkville, MS 39759



UNPACKING INSTRUCTIONS

1. Carefully lift the amplifier by the bottom cabinet edge out of the shipping carton. Place the amplifier on a firm, level surface and carefully inspect it for shipping damage. Contact the shipper immediately if any damage exists. This carton has been designed for maximum protection of the amplifier during transit. Save the carton and packing material for shipping in the future.
2. Remove all screws holding the cover on with a number 2 phillips screwdriver. Carefully lift the cover off the amplifier. Save the screws to resecure the cover.
3. Locate the fuse pack with the two 12 amp fuses and fuse caps. If additional screws are needed, they will be in the fuse pack also. **NOTE: Fuses supplied are for 120/110/100V operation. If you are rewiring the AL-811 for 240/230/220V operation, you must use 6 amp fuses.** The AL-811X export model is pre-wired for 240 V operation and is supplied with 6 amp fuses.
4. Remove the foam packing material (left side, front view) that secures the 811A tubes during transit. Carefully unwrap the tubes. Do not dislodge or break the fiber shaft that is connected to the rear input bandswitch wafer.
5. To install the tubes in the sockets be sure the large diameter pins line up with the two large diameter holes in each socket. Do NOT rock or twist the tubes excessively during the installation. If the tubes are already installed, check the tubes for proper seating. If necessary, press the tubes down into their sockets with gentle force. Do not rock or twist the tube(s) excessively. Also check that the anode caps are secure and did not come loose during the unwrapping process.
6. The white ceramic anode connectors will have to be removed from the top metal cap of each tube if it ever becomes necessary to remove the tubes from the amplifier. This can be a difficult procedure because of the high clamping force of the internal springs in the anode connector may hold it to the tube cap very tightly. The tube will break if direct upward or rocking pressure is applied in an attempt to remove the connector. The safest way to remove the ceramic connector is to lift the tube out of its socket. A twisting or spinning pulling motion can then be applied while holding the ceramic connector firmly until the tube and connector are separated. Repeat the procedure for the other tubes.
7. Install the cover with the vent holes to the left (near the tubes) by installing the back screws first. Install all the screws loosely and tighten them only after all the screws are in place.
8. Install the fuses and fuse caps on the back of the unit. Read the manual to become familiar with the operation of the AL-811 amplifier.

AL-811 LINEAR AMPLIFIER

FEATURES

The AL-811 is a grounded grid linear amplifier developed by Ameritron using low cost 811A power triodes. It operates in class AB2 for SSB and CW.

- 1. Fast Warm Up Time:** The 811A tubes take approximately 3 seconds to warm-up.
- 2. Long Tube Life:** The 811A tubes are long life, reliable transmitting tubes. 811A tubes offer operation even on RTTY and SSTV.
- 3. Tuned Input:** A Pi-Network tuned input matches the 811A tubes to 50 ohm exciters.
- 4. Two Illuminated Panel Meters:** The AL-811 has two illuminated panel meters. The Grid Current meter provides a continuous reading of the 811A grid current to indicate proper loading of the amplifier. The other meter switches between High Voltage (HV) and Plate Current (Ip).
- 5. Safety Interlock:** AC is removed from the transformer when the cover is removed. Never attempt to defeat this switch.
- 6. Operate/Standby Switch:** Used to remove the Amplifier from the RF line while filament and plate voltages are maintained for "barefoot" operation.
- 7. XMT Indicator LED:** Provides a front panel indication of proper amplifier keying by the exciter during operation.
- 8. ALC Voltage:** The drive level is detected to provide a negative control voltage for the exciter. ALC prevents overdriving of the linear and reduces distortion from excessive drive power.

CAUTION: This amplifier must be disconnected from the power mains before removing the cover. See the precaution on Page 7.

TECHNICAL SPECIFICATIONS AL-811*

Frequency Coverage

Domestic model(AL-811): 160, 80, 40, 30, 20, 17 and 15 meters

Export model(AL-811X): 160, 80, 40, 30, 20, 17, 15, 12 and 10 meters

Input

Circuit type: Pi-network, slug tuned coils

Maximum VSWR at resonance: 1.3:1

Minimum 2:1 VSWR bandwidth: 15%

Maximum drive power permissible: 85 watts

Typical drive for rated output: 55 watts

Output

Circuit type: Pi-network

1/2 hour carrier: 400 watts

30 second carrier: 550 watts

1/2 hour PEP two tone: 600 watts or better

30 seconds PEP two tone: 600 watts or better

Efficiency: typically 70% or better

ALC

Negative going, 0-20V, adjustable, phono jack

Power Supply

Circuit type: full wave bridge

No load voltage: 1700 V

Full load voltage: 1500 V

Full load current: 550 mA

Regulation: 12%

Maximum draw at rated output: 8 A(120V)

AC Input: 120V, 50/60 Hz (AL-811)

240V, 50/60 Hz (AL-811X)

Metering

Multimeter: reads HV and plate current

Grid meter: reads PA grid current

Connectors

Relay: keys amplifier when grounded. Sources +12 VDC open circuit and supplies 100 mA when grounded. A built-in back-pulse cancelling diode protects the exciter.

RF input: SO-239 50 ohm input

RF out: 50 ohms with full power into any SWR below 3:1

Power: NEMA 5-15P 120V grounded style

Physical

Dimensions: 16" D x 13³/₄ W x 8" H

Weight: 30 lbs.

*specifications are subject to change without notice or obligation.

GENERAL INFORMATION

SAFETY INTERLOCK

The interlock switch closes to allow AC line voltage to reach the power transformer as long as the AL811's top cover is in place. When the top cover is removed, the interlock opens and disconnects the line voltage. This does not discharge the bank of power supply filter capacitors. Be sure to allow the filter capacitors to discharge before you touch anything inside the Amplifier. You can select the High Voltage function of the Multimeter to check the high voltage potential. **WARNING: Never remove the cover of this amplifier with the unit plugged into the power line.**

DRIVING POWER

This Amplifier is designed to operate at full ratings when it is driven by an exciter that has approximately 70 watts of RF output. You can use an exciter that has lower output power, but the Amplifier's output may be less. If you use an exciter that delivers more than 70 watts, carefully adjust the driving power to avoid "over drive" and the creation of spurious signals, which create needless interference to other operators. We highly recommend that you use a monitor scope for continuous output monitoring. The display on an oscilloscope is the best readily available way of determining the amplitude of the voice peaks which, if excessive, can cause "flat topping" and splatter.

IMPORTANT: In no case should you advance the power output control of your exciter beyond the point where the amplifier's power output indication ceases to increase. Nonlinear operation may occur if you turn the control past this point.

FILAMENT SUPPLY

The filament circuit of this amplifier satisfies all requirements of the tube manufacturer related to tube performance and life. Inrush current is controlled by the transformer internal resistance and impedance, filament choke resistance and filament wiring resistance. To insure maximum life of the tube never replace any circuit components or wiring with substitute parts.

ALC CIRCUIT

The ALC circuit converts a portion of the RF drive voltage at the exciter end of the tuned input circuit to a negative going control voltage. This voltage should be used to limit the exciter drive to safe drive levels for the AL-811 for exciters that develop more than 70 watts of output power.

A capacitive divider consisting of C27 and C28 is used to reduce the RF voltage and drive a rectifier circuit consisting of D17 and D18. The resulting voltage is filtered by C29 and R12 and applied to the ALC potentiometer R14. R13 provides RF and DC isolation for the ALC jack. The DC isolation prevents loading of the exciter ALC input line by the ALC potentiometer.

The ALC circuit can be adjusted by loading the AL-811 slightly beyond the recommended maximum values with the ALC line disconnected. The ALC line can then be connected and the ALC control on the amplifier adjusted to a point just before the drive begins to decrease.

NOTE: The primary use of the ALC function is the prevention of excessive drive levels. This circuit will not prevent small changes in output power from occurring on different bands. Destructive levels of drive power are those above 100 watts under most conditions. Slight changes may occur in maximum output power on different frequencies with the ALC connected. A compromise in ALC adjustment may be necessary to achieve acceptable performance on all bands.

PLATE SUPPLY

The power supply in this amplifier uses a combination plate, filament and control transformer. A buck boost winding is provided to allow the user to compensate for low, medium or high power line voltages. This amplifier is normally supplied wired for the highest power line voltage setting. Never change this setting unless you are positive that performance is suffering due to low filament and plate voltages. The life of components will be shortened drastically if the high voltage exceeds 1800 volts at rest. The diagram on page 4 shows proper wiring for each voltage.

EXPORT MODIFICATIONS

A simple modification will allow operation on frequencies above 15 meters. Instructions for this modification are available by sending a written request for "Export Modification Instructions" along with a copy of a valid amateur license. There is no charge for this information. Export models are shipped with this modification and have an "X" following the serial number. Standard frequency coverages are indicated in the chart on page 7.

TECHNICAL ASSISTANCE

Technical assistance is available during our normal business hours on weekdays. The following information is required to assist you with operational problems:

1. Model and Serial Number
2. Date of purchase and dealer
3. An accurate description of the problem

Meter readings at all stages of the tuning procedure are very important along with a complete description of the other equipment used with our product.

Written assistance is also available. Due to time delays in processing mail, please allow at least three weeks for a written reply.

AMERITRON
116 Willow Road
Starkville, MS 39759
Telephone-(601) 323-8211

METERING FUNCTIONS

The AL-811 has two illuminated panel meters. The right meter reads PA grid current up to 200mA. The normal current with a single tone (carrier) signal will be around 150 mA. If the current is too high during full power operation, the loading control should be advanced to a higher setting. If the current is too low, the loading control should

be turned to a lower setting.

The left meter reads PA high voltage of 2000 volts and plate current of 750 mA. The normal readings are 1500-1700 volts HV and 550 mA of current at full rated output with a single tone signal.

INSTALLATION

LOCATION

Do not operate the Amplifier in excessively warm locations or near heating vents or radiators. Be sure air can circulate freely around and through the Amplifier cabinet. Provide an unobstructed air inlet for the blower. Do NOT place any books, magazines or equipment that will impede the free flow of air near the sides of the cabinet.

VENTILATION

The AL-811 ventilation system has been designed and tested to maintain the 811A tube temperature safely below the tube manufacturer's rating at 500 watts output with a 100% duty cycle. To insure proper ventilation in your installation, observe the following:

1. Do not block or restrict the ventilation holes in the cover.
2. The exhaust air flow is over 20CFM. Do not "assist" the air flow unless the fan exceeds the AL-811 fan CFM by a factor of 2:1.
3. Do not mount additional fans on the AL-811 cabinet.
4. The exhaust air will become warm at high power levels. Do not place any heat sensitive objects in the exhaust air stream.

GROUNDING

Connect a good earth or water pipe ground to the ground post on the rear panel of the Amplifier. Use the heaviest and shortest connection possible.

Before you use a water pipe ground, inspect the connections around the water meter and make sure that no plastic or rubber hose connections are used. These connections interrupt electrical continuity to the water supply line. Install a jumper around any insulating water connections you may find. Use heavy copper wire and pipe clamps. It is best to ground all equipment to one point at the operating position and then ground this point as described above.

POWER CONNECTIONS

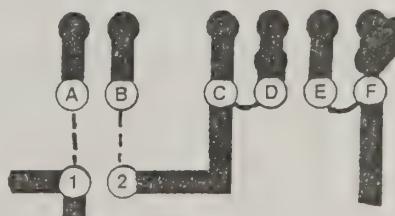
The AL-811 is supplied with a NEMA 5-15P plug for 120V operation. The power required to operate the AL-811 is not high enough to warrant 240V operation unless 120V

is not available. The fuses should be 12 ampere fuses for 120V and must be changed to 6 amperes for 240V operation. The diagram below shows the proper wiring for 120V operation. Operation on a voltage of 240V is not required, nor will it necessarily improve performance. The power transformer will perform equally well with a power line frequency of 60 Hz or 50 Hz. The Transformer Connections chart at the bottom of this page shows proper connections for various line voltages.

The AL-811X (export model) is wired for 240V, 50/60 Hz operation. The appropriate plug is not provided for this model. You must wire the proper plug on the end of the power cord supplied. Simply cut the existing plug off and wire the appropriate plug in its place. If the line voltage in your country is not 240V, then you must change the transformer to the appropriate setting indicated by the chart below. Note: the AL-811 transformer allows operation on 100V line voltage in countries such as Japan.

NEVER REWIRE THE POWER SUPPLY TO BOOST THE HIGH VOLTAGE ABOVE 1800 VOLTS.

The wiring between the fuse box and the amplifier AC outlet must be 14 gauge or larger in order to supply the operating current required (8 amperes) without a significant drop in the line voltage. The outlet should be fused for the wire gauge used.



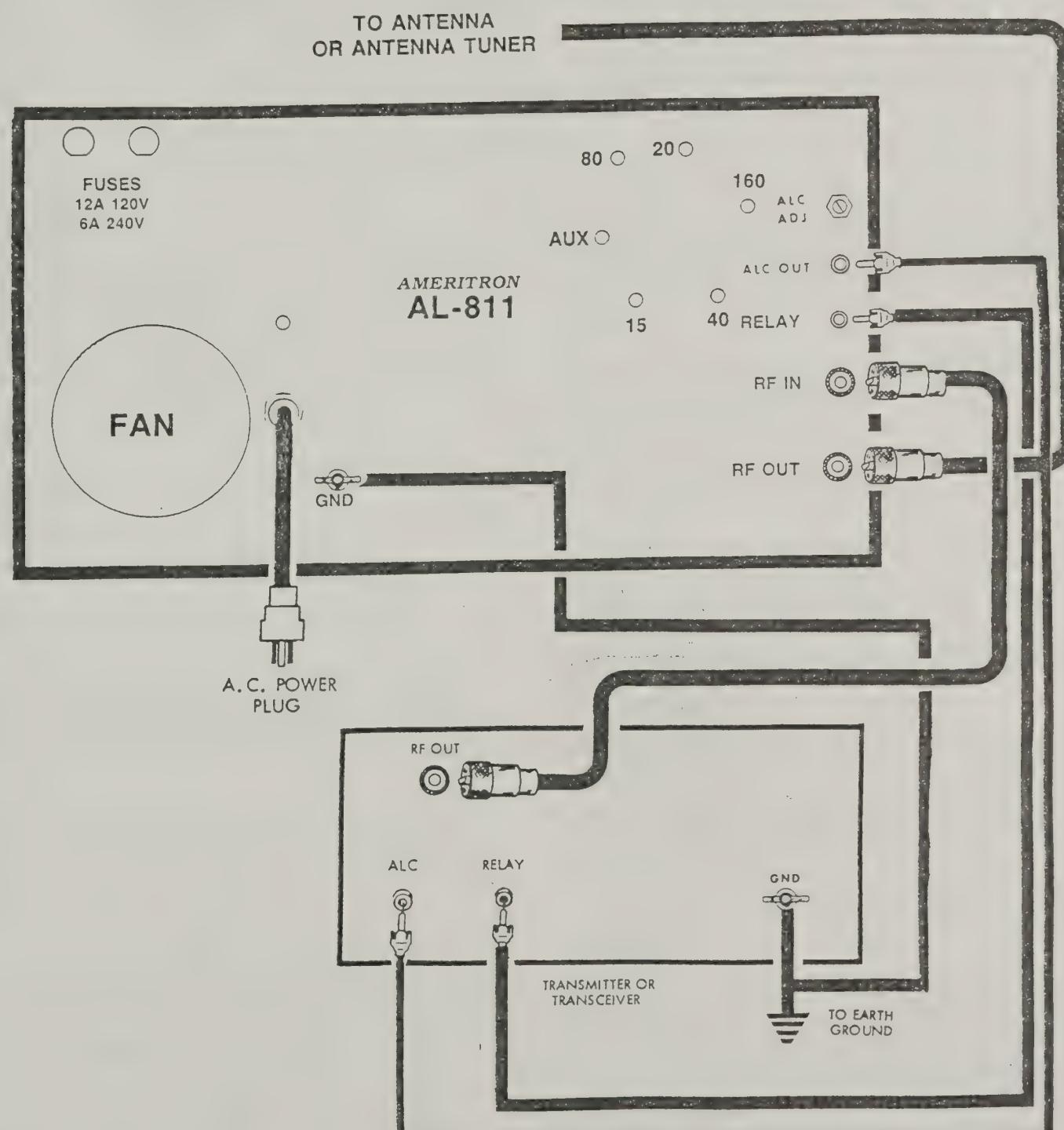
* Factory wired operation for the AL-811

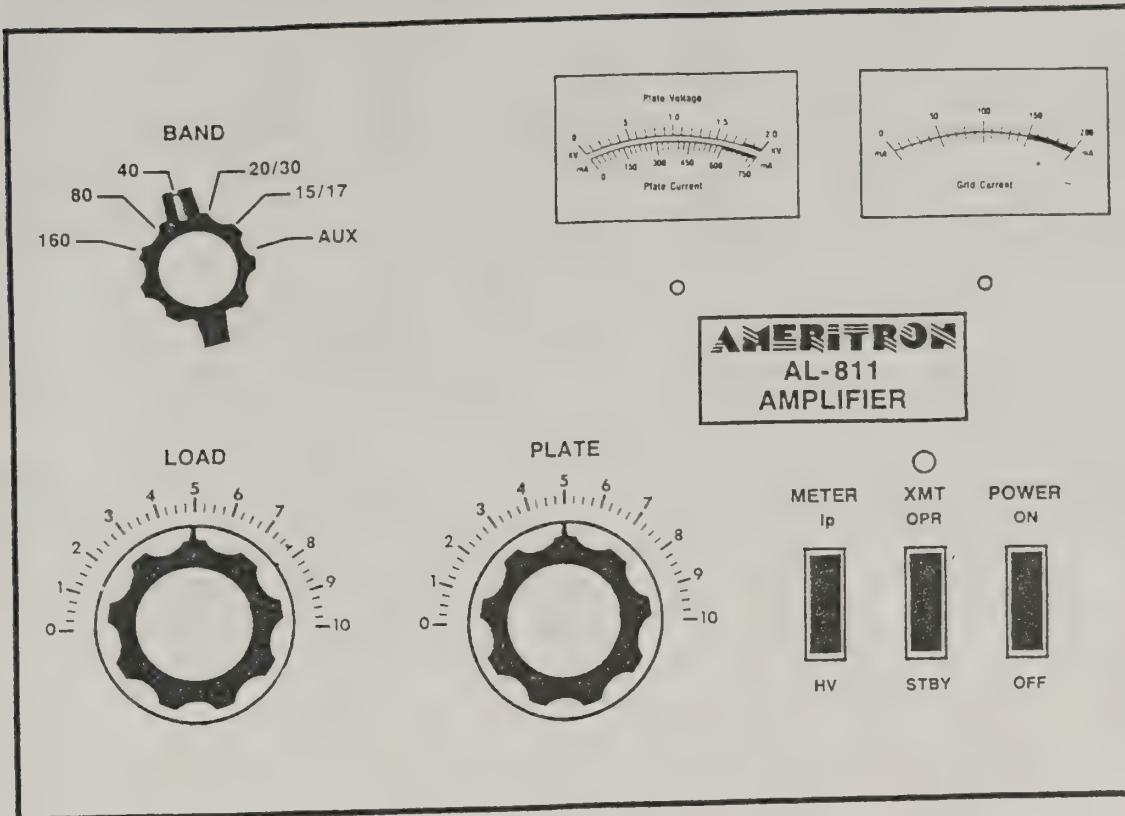
** Factory wired operation for the AL-811X

| VOLTAGE | BUCK BOOST | PRIMARY |
|---------|--------------------|-----------------|
| *120 | A to 1, B to 2 | C to D, E to F |
| 110 | 1 to 2, (A,B open) | C to D, E to F |
| 100 | A to 2, B to 1 | C to D, E to F |
| **240 | A to 1, B to 2 | C no connection |
| 230 | 1 to 2 (A,B open) | D to E |
| 220 | A to 2, B to 1 | F no connection |

INTERCONNECTIONS

1. Connect the RF output of the transmitter to the RF IN connector on the rear of the AL-811 with 50 ohm coax. Use any 50 ohm cable (RG-58 is fine) with PL-259 plugs.
2. Connect the existing station antenna system to the RF OUT connector on the AL-811 with any 50 ohm coaxial cable capable of carrying 500 watts.
3. Use shielded audio type cable with standard male phono plugs to connect the RELAY jack on the AL-811 to the exciter's normally open amplifier keying circuit. The keying circuit in the AL-811 has positive 12 VDC open circuit and provides 100 mA of current when pulled to ground. The AL-811 has an internal back-pulse cancelling diode across the relay coil.
4. Connect the shortest ground lead possible from a good earth ground to the GND terminal. The best leads are solid (instead of stranded or braided) copper. It is also best to use a common ground point for all the equipment in the station.
5. Use a shielded audio cable with a standard male phono plug to connect the ALC jack to the negative going ALC input jack on the exciter. *Do not connect this line until you have read and understand the function of the ALC circuit.* Exciters with output powers below 70 watts do not normally require this connection. If this jack is connected without adjusting the ALC control, the exciter may not develop any drive power.





TUNE-UP

CW PROCEDURE

Follow the instructions in numerical order. If the various meter readings are different than the instructions, check the connections from the exciter to the amplifier and make sure they are correct. Consult the manual for the exciter if necessary. Be sure the transformer is correctly wired for your line voltage. See the "Power Connection" instructions on page 4 for wiring details.

1. Set the AL-811 front panel switches as follows:
OFF-ON to OFF
OPR-STBY to STBY
Ip-HV to HV
2. Plug the line cord into the proper voltage outlet.
3. Set the power switch to the ON position. The meter lamps should light and the fan should start. Read the 2000 volt scale on the multimeter. It should indicate 1700 volts nominal and no more than 1800 volts.
4. With the amplifier still on STBY, tune the exciter into the normal 50 ohm load according to the manufacturer's instructions. Turn the exciter drive fully down after tuning.
5. Place the amplifier bandswitch on the same band as the exciter, the PLATE control in the dial range for the band selected, and the LOAD control as indicated:

| MHz | Load | Plate | MHz | Load | Plate |
|------|------|-------|------|------|-------|
| 1.80 | 3 | 1 | 10.0 | 0 | 7 |
| 1.90 | 4 | 2 | 14.0 | 4½ | 8½ |
| 3.5 | 3 | 4½ | 18.1 | 4 | 8½ |
| 3.7 | 4 | 5 | 21.0 | 5 | 9 |
| 4.0 | 4½ | 5½ | 28.5 | 5 | 9½ |
| 7.0 | 4½ | 7½ | | | |
| 7.3 | 4½ | 7½ | | | |

6. With the exciter drive still at zero, place the HV-*Ip* switch in the *Ip* position. Observe the 750 mA scale. It should read zero. Place the *STBY-OPR* switch in the *OPR* position.

7. Key the exciter (no drive). The Transmit (*XMT*) LED should light. Observe the plate current on the 750 mA scale. It should be 110 mA.

NOTE: The no drive current will vary up to 25% due to component and line voltage tolerances.

8. Apply only enough drive to indicate a grid current of 100 mA or an *Ip* of no more than 450 mA. Tune the **PLATE** control for maximum output power. It is normal for the plate current to dip at this point. *If the grid current goes over 150 mA, reduce the drive at once.* Unkey the exciter.

9. Observe the output on an external RF wattmeter. Increase the drive until full exciter power (never to exceed 100watts) or 150mA of grid current is achieved. Quickly adjust the **PLATE** and **LOAD** controls for maximum output power.

10. Reduce the drive until the desired output level is obtained.

NOTE: Rotating the **LOAD control clockwise reduces grid current for a given amount of drive. If the **LOAD** control is set at too low a numerical setting, a severe stress on tank components may occur. The **PLATE** control should always be peaked for maximum grid current or output power. Do not exceed 700mA of plate current during tuneup.**

OPERATION OF OTHER MODES

SSB:

Tune up the Exciter and Amplifier as described in "TUNE UP" section and switch the exciter to SSB. Normal ranges of meter readings on SSB are between 20 and 50 percent of the CW carrier readings. This is due to the different peak to average power ratios in the operators speech waveform. The only true way to measure peak output power is with a good peak reading wattmeter or monitor scope. A whistle should produce the same values obtained on CW. Any effort to run more than these values will produce splatter and distortion.

SSTV, FM, RTTY, PACKET, AMTOR:

The plate current should be limited to 400 mA maximum. The grid current should be limited to 120 mA and the amplifier tuned for peak output power with the drive reduced to hold the grid and plate currents below the ratings given.

NOTE:

Some exciters put out short duration high power RF pulses when first keyed. Exciter power output peaks may reach or exceed full output level settings even if the exciter's power control is adjusted to deliver a fraction of full power under "keydown" conditions.

The amplifier loading control must be set high enough (clockwise) to prevent extremely high energy levels from developing in the plate and grid circuits of the amplifier. **DO NOT "UNDERLOAD" THE AMPLIFIER TO REDUCE POWER.** Never "retune" the amplifier to produce higher efficiency with reduced drive except under the SSTV, FM, RTTY, PACKET, and AMTOR section. Poor linearity, splatter or even damage to components may result from failure to follow instructions.

The AL-811 will operate with full output on all WARC bands except 24.5 MHz. The AL-811X (export model) will operate with full output on all WARC bands.

STANDARD FREQUENCY COVERAGE

AL-811

| | |
|--------------|-----------------|
| 160 meters | 1.8 - 2.0 MHz |
| 80 meters | 3.3 - 4.4 MHz |
| 40 meters | 6.3 - 8.3 MHz |
| 30/20 meters | 9.5 - 15.5 MHz |
| 17/15 meters | 15.5 - 21.5 MHz |

AL-811X

| | |
|--------------|-----------------|
| 160 meters | 1.8 - 2.0 MHz |
| 80 meters | 3.3 - 4.4 MHz |
| 40 meters | 6.3 - 8.3 MHz |
| 30/20 meters | 9.5 - 15.5 MHz |
| 17/15 meters | 15.5 - 21.5 MHz |
| 12/10 meters | 24 - 29 MHz |

WARNING!!

DO NOT ATTEMPT TO PUT THIS AMPLIFIER IN SERVICE WITH THE COVER REMOVED! CONTACT WITH VOLTAGES INSIDE THIS AMPLIFIER CAN BE FATAL! ALWAYS DISCONNECT THE AMPLIFIER FROM THE POWER MAINS AND WAIT FOR THE FILTER CAPACITORS TO DISCHARGE BEFORE REMOVING THE COVER.

PERIODIC MAINTENANCE

The high voltage present on the plate choke and air variable capacitors attract dust and dirt out of the air stream. It is particularly important that the high voltage areas at the bottom of the plate choke and the insulators on the air variable capacitors be dust free. These areas should be inspected every few months if the amplifier is operated in a dusty environment. Unplug the line cord, and wait at least 90 seconds until the power supply

capacitors discharge. Remove the cover and connect a jumper wire from ground to the anode connection of the tubes. **NOTE: This is a safety wire that must be installed when beginning service work and removed when work is finished.**

Use a soft bristle brush dipped in alcohol to clean areas mentioned previously.

NOTES:

| BAND | LOAD | PLATE |
|--------|------|-------|
| 160 | | |
| 80 CW | | |
| 75 SSB | | |
| 40 CW | | |
| 40 SSB | | |
| 30 CW | | |
| 30 SSB | | |
| 20 CW | | |
| 20 SSB | | |
| 17 | | |
| 15 CW | | |
| 15 SSB | | |
| | | |

Fill in this chart with your actual settings and you can quickly change bands. We suggest you use a pencil as settings may change as you alter your antennas.

| AL-811 INPUT CHART | | | |
|--------------------|----------------|------------------|-----------------|
| BAND | C3 (PF) | L1 | C4 (PF) |
| 160 | | 28.75T(405-1287) | 1300 (208-5177) |
| 80 | | 23.75T(405-1237) | 500 (208-5691) |
| 40 | 750 (208-5668) | 13.75T(405-1137) | 500 (208-5691) |
| 20 | 330 (208-5331) | 9.75T(405-1097) | 180 (208-5605) |
| 15 | 270 (208-5775) | 6.75T(405-1067) | 150 (208-5396) |
| 10 | 180 (208-5605) | 4.75T(405-1047) | 100 (208-5174) |

PARTS LIST

Designation:

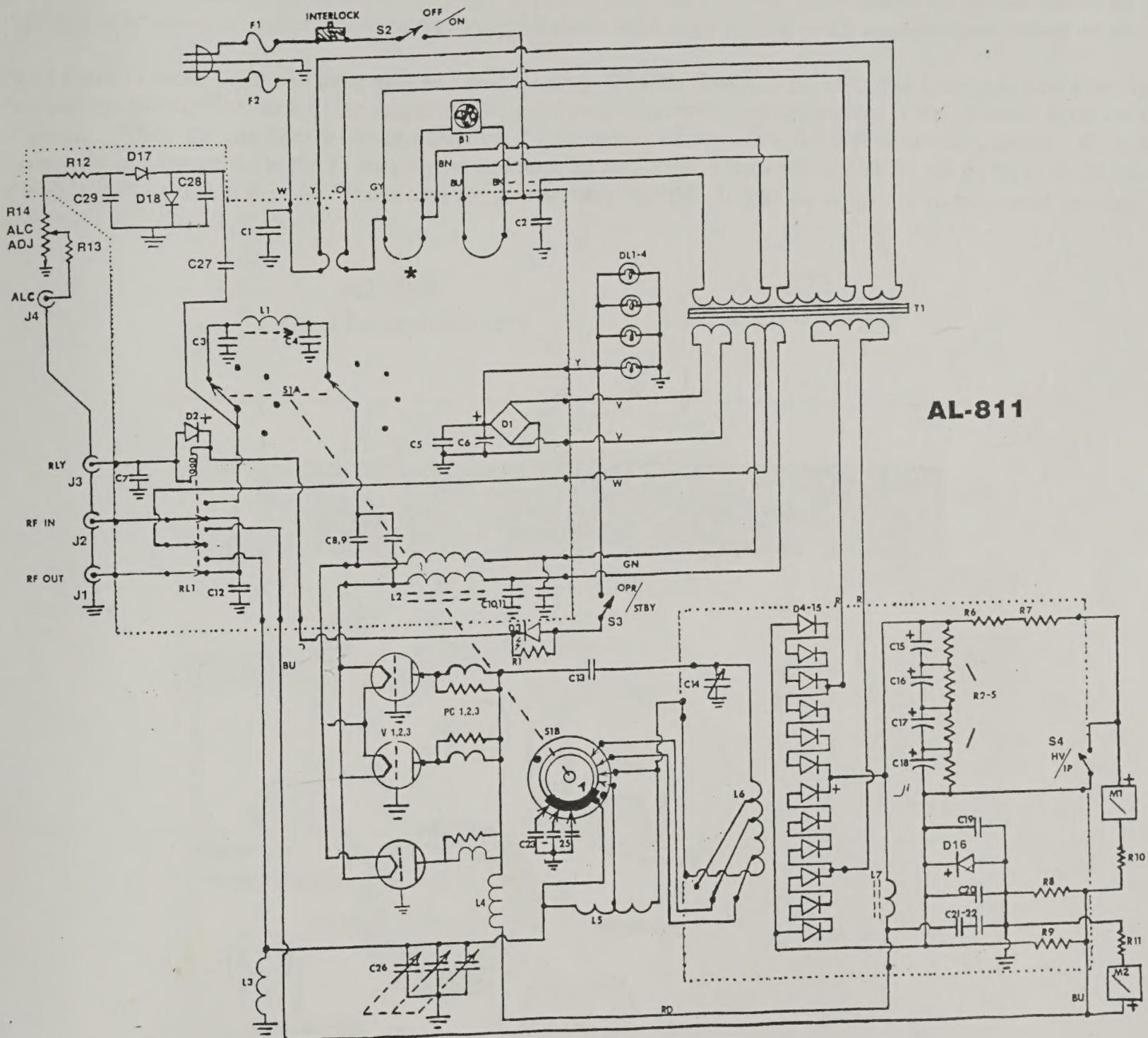
B1
 C1, 2, 21, 22
 C3, 4
 C5, 7, 19
 C6
 C8, 9, 10, 11, 29
 C12, 27
 C13
 C14
 C15, 16, 17, 18
 C20
 C23, 25
 C24
 C26
 C28
 D1
 D2, 16
 D3
 D4-15
 D17, 18
 J1, 2
 J3, 4
 L1
 L2
 L3
 L4
 L5
 L6
 M1
 M2
 R1
 R2, 3, 4, 5
 R6, 7
 R8
 R9
 R10
 R11
 R12
 R13
 R14
 RL1
 S1A
 S2B
 S2, 3, 4
 S5
 T1
 V1, 2, 3

Description:

Ameritron Part #:

| | |
|-------------------------|------------|
| Fan | 410-3583 |
| .01uf, 250V Disc | 200-2122 |
| See Input Chart | |
| .01uf, 50V Disc | 200-0416 |
| 2200uf, 25V Elec | 203-0207 |
| .01uf, 1KV Disc | 200-2121 |
| 27pf, 500V DM10 | 208-5404 |
| .001uf, 7.5KV Disc | 200-7224 |
| Air Variable | 204-2572-1 |
| 210uf, 470V | 203-0578 |
| .1uf, 25/50V Disc | 200-0754 |
| 365pf, 500V DM19 | 208-5688 |
| 500pf, 500V DM15 | 208-5691 |
| Air Variable | 204-2113 |
| 150pf, 500V DM15 | 208-5396 |
| Bridge rectifier | 300-9646 |
| IN4007 | 300-0266 |
| MV6753 Red LED | 320-0522-1 |
| IN5408 | 300-0145 |
| IN34A | 300-0346 |
| SO-239 | 610-2126 |
| Single Phono Jack | 600-1225 |
| See Input Chart | |
| Choke Filament | 10-15115 |
| 2.5mH Choke | 402-1162 |
| 5½ turns Plate Choke | 10-15139 |
| #16 Air Coil | 404-0811 |
| HF Coil | 10-13140 |
| Plate V/I Meter | 400-2601 |
| Plate Current Meter | 400-2600 |
| 33 ohm, ¼W | 100-0403 |
| 50K, 7W Type 170S | 103-7580 |
| 1 Meg, 3W | 103-2223 |
| 1.5 ohm, 3W Type 135 | 103-3400 |
| .6 ohm, 3W Type 135 | 103-3399 |
| 330 ohm, ¼W | 100-0330 |
| 180 ohm, ¼W | 100-0120 |
| 3.3K ohm, ¼W | 100-0729 |
| 10K ohm, ½W | 101-0645 |
| 100K ohm, Pot | 105-1341 |
| 12V DC Relay | 408-6140 |
| Wafer Switch | 500-4811 |
| Band Switch | 500-2811 |
| SPST Switch | 503-1147 |
| Safety Interlock Switch | 504-3247 |
| Power Transformer | 406-1532 |
| 811A tube | 350-0811 |

AL-811 SCHEMATIC
Power supply shown wired for 120V operation *



15/17 METER TUNING NOTICE FOR AL-80B / AL-572

The AL-80B has two jumpers located on the Input Filter Board. To operate on both 15 and 17 meters these jumpers must be removed to have a reasonable in between VSWR match on the input of the AL-80B. The AL-572 has one jumper, located on the Input Filter Board, that must be removed to operate on both 15 and 17 meters. This is also done to have a reasonable in between VSWR match on the input of the AL-572. Refer to the figure below for the location of the jumpers that need to be removed. After removing the jumper(s) check for foreign objects in the amplifier and replace the cover.

The 15 and 17 meter input coil must now be tuned for a low VSWR. Use a .1 inch hex head non-conductive tuning tool to tune the coil through the back of the amplifier. First set your transceiver to a frequency in the 15 meter band and tune the amplifier. While the amplifier is keyed adjust the 15/17 meter coil for a low VSWR to the transceiver. Next, set your transceiver to a frequency in the 17 meter band and tune the amplifier. Check the VSWR to the transceiver. If the VSWR is high, slightly readjust the 15/17 meter coil for a reasonable VSWR. It may be necessary to tune to an average to get a reasonable VSWR on both bands.

